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NOTICES:—All communications relating to editorial matter should be addressed to the Editor who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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Chemistry and National Life

IN his pleasant speech at the first annual dinner of the Chemical Industry Club last week, Sir William Pope referred to two points of great importance to the future of chemical science and industry in this country. One was the need for securing for chemistry recognition, not only as one of the leading professions, but as an increasingly important factor in the life of the nation. The other was the need of a central headquarters in London, large enough to house the principal organisations interested in chemistry, whether pure or applied. The two things really go together, for once the first is established the other follows. It is no defect in Sir William Pope's scheme that it is immensely ambitious, for only a large and daring scheme is likely to elicit an adequate response in funds, and it is only by persistent preaching of the need that our wealthy firms and individuals can be brought to realise it. We are not quite sure, although they recognise the analogy with the professions of law and medicine, that chemists are very eager to see their profession exalted to the status of the Church, as Sir William playfully hinted. In that case we might have Parliament pronouncing judgment on chemical problems with an ignorance as profound and an insincerity as obvious as that with which it discusses ecclesiastical ornaments or the Articles of Religion. But there is substance in the point that the chemical profession should itself recognise and seek the place in national life to which it is entitled, and should begin to offer its contribution to national thought, not merely in the terms of the laboratory, but in the current language of public life.

This idea is not limited to chemistry in this country. Something of the same feeling is growing up in our Colonies and the United States. The vocation of chemistry is apt to induce an attitude of isolation and introspection, and to leave its followers more or less a class apart. To this cause must be ascribed the nation's failure to appreciate fully both the bulk and the value of the chemist's contribution to national progress, and if the fault is to be remedied chemists must themselves be prepared to overcome a little of their present aversion to publicity. This point is now exercising the minds of our chemical brethren in Canada, and in discussing it the *Canadian Chemical Journal* offers observations which in some degree apply to conditions in this country. Appealing for a broader and less exclusive outlook, it says: "The success of a meeting is not always to be measured by the number of chemists present, but rather by the number of other professions and business men who have been found willing to mix with them in this way. The best meetings are not those which are the most technical, but rather those which have a general appeal with a chemical flavour. The essential idea is the creation of the chemical point of view in the minds of a larger number. Broaden the significance of the word chemistry in the minds of all classes of manufacturers and technical men. There is a place for the group of technical experts, who should meet and have their special speakers, but at those larger gatherings a great opportunity is missed if the type of mind present remains too confined." This comes very much to what we have been saying. If chemists are to make the work of their profession understood by the nation they must learn to interpret it in terms and from the point of view current in public life. When that is done the scientific fascination of the work and its vital relation to national industry will command a public interest as wide and as keen as that enjoyed by any other secular profession, or—to quote Sir William Pope once more—even by the Church.

The Gospel of Production

It will be agreed that Sir Leo Money is scarcely an impartial observer, but from his pen there is an interesting article dealing with production in last Sunday's *Observer*. Sir Leo, who is a well-known champion of the rights of the miner, finds particular cause for elation in the fact that the output of coal is increasing in spite of the reduction of hours now worked. He points out that the output for the week ended October 18 rose to a figure which, if maintained, will give an annual turn-out of nearly 246 million tons. This is only some 40 million tons short of the production of the last complete pre-war year, namely, 1913. It was in the middle of July that the nominal eight-hours' day of the miners was reduced to seven hours; and, contrasting the figures above, it is found that, with the hour's reduction in work, output shows a decrease of only 69,000 tons per week in total. It is clear, therefore, that the recovery in output is due to either or both of two causes: better work by the miner or improvement in the conditions of work through the making good of the war deterioration of the mines.

In view of the fact that the week ended October 18 began so soon after the termination of the railway strike, however, the miners could not have been working under good conditions, and, therefore, considerable weight must be given to the effect of the human factor. As Sir Leo says, if the miners in a shorter working day soon overtake the pre-war output figure they will have done much for the shorter working day in general, which reminds one of the experience of a certain branch of the Ministry of Munitions. Obtaining too great an output of a certain article, they issued instructions for shorter hours to be worked upon it; as a result they obtained not less of the article but more. It is clear that we have yet to discover in industry the happy mean of working time. Very much, of course, depends upon the individual, and in this connection experience is extremely variable, for among British working men there will always be those whose chief interest is that of watching the clock until it points to closing time. Meanwhile, the national income has nearly doubled, as expressed in money, but it will not be doubled intrinsically until not only this country but the world as a whole produces twice as much in commodities—not necessarily goods alone, but goods and services.

Dealing with the production of iron output, Sir Leo Money remarks that Germany in 1914 was a good second to the United States, with Britain a bad third, and France, after a very long interval, fourth. The war has changed all that. As to our own steel output, the stimulus of the war and the active administration of the Steel Department of the Ministry of Munitions raised a stagnant output of about seven million tons to nearly ten million tons. As to Germany, the Peace Treaty takes the greater part of what were counted German iron resources and restores them to France. This will probably mean, in annual production of iron ore, that whereas in 1913 Germany produced twenty-seven million tons, she will now produce only seven million tons, while the production of France will rise from twenty-one million tons per annum to forty-two million tons. In spite of the loss of the Saar valley area the greater part of Germany's enormous coal resources remain intact, and with the possession of the all-essential fuel supply she will not fail to maintain, by the importation of ore, a big iron and steel industry. Accordingly, in spite of her losses, it is probable that in ten years' time Germany may have largely recovered her former position as an iron and steel producing country.

The Oilfields of England

No matter where or in what quantity it occurs oil has at the present time a remarkable fascination for anybody with money to spare and the average amount of credulity. The mere mention of the word in a prospectus is sufficient to indemnify underwriters against the risk of being left with stock on their hands, and it would seem that even the most prudent investor is beginning to find gilt-edged securities a trifle dull and unprofitable after the 6s. tax has been deducted. The general scramble to accumulate riches by a royal road is probably the natural result of the increased spending capacity of most individuals which has arisen out of the war; while many of those who find themselves comparatively wealthy to-day for the first time in their lives feel that they can afford to risk a reasonable proportion of their surplus assets. The manner in which new issues are being over-subscribed is certainly promising from the point of view of the country's trade prospects; for, whether the innumerable new ventures meet with success or not, the money is circulating and is providing employment and, incidentally, experience.

So far as home-produced oil is concerned we have stated before that everything is still in the experimental stage, and on this account the dividend-earning prospects of concerns operating on supposed fields in this country are certainly problematical; but it would be to the immense advantage of the country as a whole if we could render ourselves partially independent of overseas supplies. Shareholders in the home concerns are, therefore, at least behaving patriotically by parting with their money, and we wish we could think this the sole impulse which prompts their subscriptions. That it is not may plainly be seen from the present demand for shares in oil concerns operating in the most remote parts of the world. In this connection it may be noted that, with the future for oil fully recognised, there is no reason why those undertakings which already show a large and assured output should not reap an immense harvest so long as their spouters remain active. In our view, therefore, it is existing output, and not vague calculations as to prospective yields, which should primarily be considered by those who are disposed to try their luck with oil.

While on this subject attention may be called to the general meeting last week of the Oilfields of England, Ltd., the first company formed in Great Britain for the purpose of boring for a home supply of oil. The company's field is situated on the Ke'ham estate in Nottinghamshire, and active operations are about to begin. As the chairman remarked, the capital had been subscribed with "the definite object of proving whether oil existed" on this estate. He admitted that the company's future was speculative, and that the thing they had to prove was whether there was sufficient oil to pay dividends. We look upon this as a praiseworthy and candid expression of the true state of affairs, and trust that if in the future money is required for similar ventures as precise a statement will be made when subscriptions are invited.

A Joint Chemical Library

In a pamphlet on "The Library of the Chemical Society" Mr. F. W. Clifford gives an interesting account of a recent attempt at co-operation. The activities of the war, he explains, caused a considerable demand upon the resources of all libraries of a technical character, and that of the Chemical Society was frequently called upon by the War Office and other Government Departments for works which could not be found elsewhere. Luckily for the nation, the policy of the Council towards the library has always been of a generous nature. The systematic consideration of new books, and their purchase by the Committee irrespective of demand, had resulted in a collection of volumes, not only containing all books dealing with the scientific side of chemistry which were of any real value and importance, but also books on applied chemistry when these dealt with the chemistry of the processes involved. Consequently important works of foreign origin were to be found upon the library shelves, and were of the greatest possible value to the various War Departments and to manufacturers who were striving to make essential products hitherto made in what had become an enemy country.

The Library Committee, on inquiry into this increased use of the library, decided that the demand was likely to be permanent, and that the time had arrived for the extension of the Society's Library in the more technical direction. They were also of the opinion that if the Chemical Society were to place the existing library and proposed extension at the service of members of such other societies and associations as might wish to co-operate, they would probably be glad to relieve themselves of the necessity of collecting and maintaining the literature of their special subjects, whilst at the same time they would assist in the formation of a representative Library of Chemical Literature such as would be difficult to obtain by individual effort. It was also hoped that the project of co-operation in the use of one central Library of Chemical Literature might assist in promoting a closer relationship between the several societies dealing with the various aspects of chemical science.

Various societies and associations were approached, and at a conference in March, 1918, a number of them intimated their desire to co-operate, and offered financial assistance. In order that the library should be of the greatest value, it was considered necessary to extend the hours of opening, and a provisional scheme was begun in January, 1919, with extended opening on three days weekly. The full proposal was carried out on May 1, and the library is now open daily from 10 a.m. to 9 p.m., with the exception of Saturdays, when it is closed at 5 p.m. The co-operating societies are: The Association of British Chemical Manufacturers, the Biochemical Society, the Faraday Society, the Institute of Chemistry, the Society of Chemical Industry, the Society of Dyers and Colourists, and the Society of Public Analysts. The Library Committee is composed of six Fellows of the Chemical Society, the honorary officers, the editor, and the librarian, together with seven representatives from the contributing societies. The present chairman of the Committee is Professor J. M. Thomson.

Nitrogen Products Committee

The announcement by the Secretary of the Ministry of Munitions that the report of the Nitrogen Products Committee will shortly be published will revive public interest in a subject which has been pretty vigorously discussed of late. The Committee's recommendations, it is understood, include proposals for meeting at home a portion of the growing demand for various nitrogen products, for conserving and increasing the output of by-product ammonia from gas works, coke ovens, &c., for securing the better utilisation of the national resources in coal, and for reducing the consumption of raw coal as fuel. The main interest of the report, however, lies in what it may disclose respecting the measures taken during the war for the production of synthetic ammonia. The Ministry of Munitions, it may be recalled, began, during the war, the erection of a factory at Billingham-on-Tees, covering 271 acres. At the conclusion of hostilities work on the construction of the factory was suspended, pending further consideration as to the best method of fulfilling the intentions of the scheme. It is now thought that by a modification of the scheme it can be made capable of producing ammonia synthetically on a commercial scale, and the Government have decided that further development shall be left to private enterprise. The Minister of Munitions is accordingly prepared to consider offers for the acquisition of the partly-constructed factory at Billingham, with plant and other realisable assets, from persons or firms in a position to develop successfully the fixation of atmospheric nitrogen. The adequate assurance of the production of nitric acid, &c., for service explosives, will be a condition of the transfer. Those desirous of making offers should communicate direct with Sir Howard Frank, Ministry of Munitions, 4, Whitehall Court, S.W. 1.

The Calendar

Nov. 10	Biochemical Society.	King's College Strand.
11	"Evaporation," by J. A. Reavall, M.I.M.E. (Kestner Evaporator & Engineering Co., Ltd.).	Manchester Municipal College of Technology.
11	Sheffield Association of Metallurgists and Metallurgical Chemists. "The Elastic Limit," by F. C. Thompson, D.Met., B.Sc.	Royal Victoria Hotel Assembly Room, Sheffield.
13	Institution Electrical Engineers. Roger T. Smith: Presidential Inaugural Address.	Inst. of Civil Engineers, Great George Street, S.W. 1.
13	Society of Chemical Industry (Birmingham and Midland Section). Joint Meeting with the Birmingham Metallurgical Society. "Production of Artificial Abrasives in the Electric Furnace," by C. J. Brock (Thorold, Ontario).	The University Buildings, Edmund Street, Birmingham.
13	Society of Chemical Industry (Bristol Section). "Sulphur and Pyrites Burners," by C. A. Hawkes. A communication from the Chemical Engineering Group.	Chemical Department, Woodland Road, The University, Bristol.

Department of Explosives Supply

Statistical Work of the Factories Branch (I)

A report of great interest on the statistical work of the Factories Branch (Ministry of Munitions Department of Explosives Supply) has just been issued. A feature of the report is an elaborate series of tables, too numerous to be reproduced, but well worth the study of all interested in the subject of cost keeping and the promotion of efficiency in chemical works. We give below the first instalment of an abstract of the letterpress of the report, which is published by H.M. Stationery Office, price 4s. 6d. net.

As soon as the national explosives factories began to come into operation, it became evident that a very detailed system of statistical control would be necessary if reasonable economy in the consumption of raw materials were to be attained. Even before the large factories were brought into operation, systems of record were drawn up in readiness, in order that information might be available from the outset as to efficiencies of working and quantities of materials handled. The value of such systems became so apparent that similar methods were adopted on factories already in operation, and were even extended to factories not under the control of the Factories Branch. The statistics of explosives manufacture as developed by the Factories Branch are considered from two points of view, the first being the plant or technical aspect, and the second the "costing" aspect. In connection with the first, the records of plant working are dealt with, and the methods of summarising these in order to ascertain the efficiencies of the plants and the consumptions of raw materials; while under the second are considered the methods of finding the actual costs of the finished product, as well as the cost on a comparative basis.

The cost and technical records were received by the Statistical Section in London from all factories controlled by the Factories Branch and also from a number of those controlled by other branches of the Department. These costs were analysed and comparative costs constructed from them, in which the aim was to place, as fairly as possible, all the factories on a comparative basis. For example, raw materials were charged at a uniform flat rate to all the factories, and factors were noted which operated favourably or otherwise against a factory. When these costs had been analysed, summaries were printed, with comments on the working of the various factories, and graphs were prepared showing these figures in detail, so that an easy comparison could be made of the working at the various factories. These summaries and graphs constituted the agenda for meetings held at Storey's Gate, presided over by Mr. Quinan. These meetings were attended by representatives of the factories, and the comparative costs were discussed and attention drawn to abnormal features, explanations being given as far as possible by the representatives present. The result of these meetings was to institute a feeling of rivalry between the various factories which proved most beneficial in improving efficiencies and reducing costs.

A great deal of extremely detailed work was necessary in order to obtain the comparative data required. In the first place, provision had to be made for determining the quantities of all materials handled daily on the factories. This involved not only ample provision of adequate measuring apparatus, but an extensive system of records and tabulations on each plant and section. The chemist in charge of each plant was responsible for these daily returns. In addition, each factory had to maintain a central statistical staff, the duty of which was to collect, check, reconcile, tabulate, and summarise various factory daily reports and to prepare the daily, weekly, and monthly reports sent to London. Many sources of error and loss were quickly revealed by these technical records. The larger sources of loss shown up by the reports were quickly remedied, and only the delicate and more difficult work of converting moderate into very good efficiencies remained to be done. The technical records were usually summarised for weekly, monthly, or longer periods. The cost records were made out at more frequent intervals than was the custom in most chemical works, namely, monthly, in view of the fact that such enormous quantities of money and materials were involved that it was desirable to keep the Department in London as closely in touch as possible with the working and progress of the factories.

The report is divided into eight sections, the first two of which are given in this week's issue, namely:—(i) The materials manufactured by the factories, and a general account of the processes involved; (ii) The technical aspect of acids manufacture and treatment, and the technical records concerned therewith; (iii) The actual cost records dealing with acids manufacture and recovery; (iv) The comparative costs for acids; (v) The manufacture of explosives such as nitroglycerine, nitrocellulose, TNT, cordite, picric acid, phenol, etc., with the technical records involved; (vi) The method of finding the actual costs of these substances; (vii) Flow-sheets showing the efficiencies of plants and the consumption of materials involved in these manufactures; (viii) comparative costs.

I.—General Account of Materials and Processes

The materials manufactured by the factories directly controlled by the Factories Branch fall under four headings:—(1) Propellant explosives; (2) High explosives, or products from which high explosives may be made; (3) Calcium nitrate, ammonium nitrate, ammonium perchlorate; (4) Poison gas.

The first section includes:—(*a*) Nitrocellulose and nitroglycerine; (*b*) Cordite, which is made from nitroglycerine and nitrocellulose. The second section includes:—(*c*) TNT; (*d*) picric acid; (*e*) Synthetic phenol, from which picric acid is made; (*f*) Tetryl.

Although the propellant and high explosives differ from one another very considerably in their chemical constitution, and in the reactions by which they are made, the methods of manufacture are very similar. With the exception of synthetic phenol, which is not itself an explosive, but merely the material from which explosive is manufactured, all the finished products of H.M. Explosives Factories are compounds produced by the action of nitric acid on organic material.

High Explosives

The class of high explosives consists chiefly of certain of the so-called "aromatic" nitro-bodies, that is, of bodies obtained by the action of nitric acid on substances derived from the parent hydrocarbon benzene.

The following table will serve to show the class relationship which exists between those high explosives which are manufactured at H.M. Factories:—

Benzene	$C_6H_5 . H$		
Phenol	$C_6H_5 . OH$	$C_6H_2(NO_2)_3 . OH$	Trinitrophenol or Picric Acid
Toluene	$C_6H_5 . CH_3$	$C_6H_2(NO_2)_3 . CH_3$	Trinitrotoluene or TNT
Aniline	$C_6H_5 . NH_2$		
Dimethylaniline	$C_6H_5 . N \begin{cases} CH_3 \\ CH_3 \end{cases}$	$C_6H_2(NO_2)_3 . N \begin{cases} NO_2 \\ CH_3 \end{cases}$	Trinitrophenylnitramine / Tetranitromethylaniline — or Tetryl

Propellant Explosives

Propellant explosives are compounds obtained by the action of nitric acid on various hydroxy-derivatives of the class of aliphatic compounds, the most frequently employed being glycerine and cellulose in the form of cotton waste. By this action the OH group of the hydroxy-body is replaced by an NO_3 group. The products are called respectively nitroglycerine and nitrocellulose, though they do not belong to the true class of nitro compounds.

In the case of all these explosives, therefore, the bodies dealt with are formed by the action of nitric acid on various substances. This action, as carried out in actual manufacture, is called nitration, and the manufacture of many explosives, therefore, may be said to be—in essence—the nitration of certain suitable bodies. The operation of nitration is usually carried out in the presence of sulphuric acid, which absorbs the water produced by the reaction and acts as a medium for the reaction. Sulphuric acid also is required for the manufacture of nitric acid, so that the manufacture of explosives involves the handling of large quantities of this acid and of its mixtures in various proportions with nitric acid.

The manufacture of any explosive may, therefore, be roughly

outlined in the following stages :—(1) Manufacture of nitric acid; (2) preparation of a suitable mixture of nitric and sulphuric acids; (3) nitration; (4) subsequent treatment of the nitrated material to obtain the finished explosive; (5) treatment of the waste acid from nitration for the recovery of the sulphuric acid and of such nitric acid as it may contain.

In addition to these stages the manufacture of an explosive or explosives at any factory may involve :—(6) The manufacture of sulphuric acid or of oleum; (7) the preparation or purification of the substances to be nitrated; (8) the manufacture, purification, or recovery of various solvents required in the final preparation of the explosive from the nitrated body.

This brief outline furnishes the basis for the tabulation and analysis of the results of the technical working of the various processes involved. Accurate and detailed periodical returns were compiled for each process, not only for technical purposes, but also for cost purposes. The technical records for each particular process set forth the quantities of raw materials, intermediate bodies, or acids dealt with, and the quantities of finished materials and waste or recovered acids produced. Statements were also drawn up indicating the efficiency of each operation. The records also showed stocks of materials and acids, and the transference of these from one section to another.

II.—Technical Records Dealing with Acids

Manufacture of Nitric Acid

In all factories under the control of the Factories Branch nitric acid is manufactured from crude sodium nitrate, or Chile saltpetre, and sulphuric acid. The factory records show in each case the number of retorts working, the amount of crude nitrate charged, whether the latter is wet or dry, and the equivalent amount of $NaNO_3$; the amounts and strength of sulphuric acid used and of strong and weak nitric acid obtained (including lower nitrogen acids reckoned as HNO_3); the nitre cake produced and despatched and the acidity thereof; the efficiency of working, &c. In checking these figures the following numerical relationships were employed :—

$NaNO_3$	...	...	...	...	...	HNO_3
85	...	...	...	...	...	63
1.35	...	...	...	...	...	1.00

Hence, to obtain 1 ton of HNO_3 requires by theory the decomposition of 1.35 tons of $NaNO_3$; and since crude nitrate contains 94 to 98 per cent. of $NaNO_3$, the purity of this material must be considered in calculating the efficiency. At factories where the nitrate was dried the records show the amounts of wet crude nitrate charged to the drier, its percentage of $NaNO_3$ and water, and also the dried nitrate produced and its composition. If bag-washing plants were in operation the records show the number of unwashed bags charged, the number of dried bags, and the amount of sodium nitrate produced.

Preparation of Suitable Mixtures of Nitric and Sulphuric Acids

The mixed acid used for nitration is made from calculated quantities of various constituent acids, viz., oleum, sulphuric acid, nitric acid, and also spent acids, the latter being used especially in the production of nitrocellulose, mononitrotoluene (MNT), and dinitrotoluene (DNT). The mixing records, therefore, give the consumption of certain quantities of these acids, together with the production of corresponding quantities of mixed acids of definite compositions. Considerable difficulties were experienced on all factories in reconciling quantities of mixed acids produced with the quantities of oleum, sulphuric and nitric acids employed. In more than one case a complete re-calibration of all vessels employed for acid measurement and storage was found necessary, and errors amounting to 2 per cent. were discovered.

Manufacture of Sulphur Trioxide (SO_3)

The sulphuric acid consumed in the production of an explosive must either be purchased from an outside maker or manufactured on the factory itself. Most of the sulphuric acid made in England was obtained by the "Chamber" process, which produces an acid containing about 70 per cent. of H_2SO_4. This acid must be concentrated to a strength of 94 to 96 per cent. of H_2SO_4 before it is suitable for use in explosives manufacture. Generally, acid of this strength cannot be used alone to produce mixed acid containing a sufficiently low water percentage. In order to produce mixed acids containing less than 5 per cent. of water it is as a rule necessary to use, in addition to strong sulphuric acid, a material known as oleum or fuming sulphuric acid. This material is a solution in sulphuric acid of sulphur trioxide (SO_3), which has the property of combining with water to form sulphuric acid according to the following equation :—

$$SO_3 + H_2O = H_2SO_4$$
$$\text{Sulphur trioxide} + \text{water} = \text{sulphuric acid}$$
$$80 + 18 = 98$$

from which it appears that 80 parts of SO_3 can unite with 18 parts of water to form 98 parts of H_2SO_4.

Ordinary commercial oleum is known as 20 per cent. oleum, which indicates that it contains 80 per cent. of H_2SO_4 and 20 per cent. of free SO_3 as such, and not in combination with water, as in sulphuric acid. 100 parts of oleum, *i.e.*, 80 parts of H_2SO_4 + 20 parts of SO_3, can take up $\frac{18}{80} \times 20 = 4.5$ parts of H_2O, yielding $80 + 24.5 = 104.5$ parts of H_2SO_4.

Practically all the sulphuric acid producing plant in operation at H.M. factories falls into the class known as oleum plant—that is, it is capable of producing sulphur trioxide, which can be delivered, in combination with greater or smaller quantities of water, as oleum or as sulphuric acid of any required strength. Usually the water required to combine with the sulphur trioxide is supplied in the form of a more or less dilute sulphuric acid, the reason being that direct reaction between sulphur trioxide and water alone is not practicable, for various reasons which need not be discussed here. The operations carried out on any oleum plant may be summarised as follows :—

(1) Sulphur, either as crude sulphur or in the form of some sulphur-containing mineral, is burnt in excess of air to form sulphur dioxide (SO_2). The mineral generally employed for this purpose is pyrites (sulphide of iron), which when burnt in air forms sulphur dioxide and oxide of iron.

(2) The sulphur dioxide mixed with air is freed from dust by suitable filters, and from water vapour by means of drying towers, in which concentrated sulphuric acid is circulated. Strong sulphuric acid is a powerful dehydrating agent and absorbs the moisture from the gas, being itself eventually delivered from the drying towers as dilute acid containing about 70 per cent. of H_2SO_4.

(3) The dried purified mixture of sulphur dioxide with excess of air, after suitable regulation of the temperature, is passed through a converter, which brings about the oxidation of the sulphur dioxide to sulphur trioxide by what is known as catalytic action.

(4) From the conversion chamber the mixture of gases, after giving up its heat in suitably arranged heat-exchangers, passes to absorption towers, in which the sulphur trioxide is taken up by means of sulphuric acid of suitable strength. The nitrogen and excess of oxygen are then delivered to the atmosphere, whilst the hot acid from the bottom of the towers is cooled and delivered to mixing tanks, in which its strength is finally adjusted, and eventually to storage tanks.

The records for the oleum plant therefore indicate :—

(1) The amount of sulphur burnt, either as crude sulphur or in the form of pyrites, and the sulphur trioxide which should theoretically be obtained from the equivalent amount of pure sulphur.

(2) The amount of sulphur trioxide put into the plant in the form of feed acid, *i.e.*, acid for drying and absorption towers.

(3) The amount of sulphur trioxide obtained from the plant, partly as weak acid from the drying towers, partly in the form of the desired product, *i.e.*, as strong sulphuric acid or oleum.

The efficiency of the plant is then deduced from these data in the following manner :—From the total sulphur trioxide delivered by the plant, both in the form of weak acid and as the desired product, is subtracted the amount of sulphur trioxide delivered to the plant in the form of feed acid. The difference obtained represents the amount of sulphur trioxide produced from the sulphur or other material burnt. This amount, divided by the sulphur trioxide theoretically equivalent to the sulphur in the material burnt, gives the efficiency of working. The sulphur trioxide theoretically equivalent to the sulphur burnt is obtained from the following equation :—

$$2S + 3O_2 = 2SO_3$$
$$\underbrace{2 \times 32}_{64} + \underbrace{3 \times (2 \times 16)}_{96} = \underbrace{2 \times 80}_{160}$$
$$\text{or } 100 \longrightarrow = 250$$

Waste Acid Treatment

The waste acid from the nitration process consists of the sulphuric acid originally used for mixed acid, together with the water formed or added during nitration, and any unchanged or reduced nitrogen acids formed from the excess of nitric acid originally used, less a certain loss of both sulphuric acid and nitric acid in some cases, *e.g.*, where the waste acid is displaced by water, due to sending the last acid runnings down the drain. It is obvious that this valuable material cannot be wasted, but must be treated to recover in a usable form the nitric acid and sulphuric acid which it contains. The operation used for this purpose is known as denitration. In the case of nitroglycerine or TNT waste acid, this operation is carried out in columns, in which a descending current of the waste acid meets an ascending current of superheated steam. The effect of the steam is to decompose the derivatives of the nitric acid, and to drive these off, along with any nitric acid present in the form of gas or vapour, which is recovered in absorption towers. The sulphuric acid recovered at the bottom of the denitration column should be entirely free from nitric acid and other nitrogen compounds.

Nitrocellulose waste acid, on the other hand, is treated in stills, which are heated by external firing. The nitric acid, being more volatile than sulphuric acid, is driven off in the form of vapour with relative ease, and is collected by means of suitable condensing apparatus. The nitric acid so obtained is, for the most part, in the form of strong acid, but a certain amount of water is invariably driven off as the temperature rises, so that the later fractions of the acid are considerably weaker than the first fractions. Since it may not be possible to use all the weak nitric on the plant—*i.e.*, the weak nitric acid delivered by both the stills and the retorts—for acid mixing in the manufacture of nitrocellulose, it is customary to collect all the weak nitric acid which cannot be utilised for acid mixing purposes, and to mix it with strong sulphuric acid. This mixed acid is then returned to the stills and the nitric acid distilled off, most of the water remaining with the sulphuric acid. Since, however, any distillation of this kind will always yield a certain proportion of the nitric acid in the form of weak acid, it is obvious that there is a continual circulation of nitric acid through the stills in the process of conversion to strong nitric acid

The same consideration applies, to a certain extent, to the treatment of nitroglycerine waste acid. The denitration of this acid in columns gives rise to a relatively weak nitric acid, which, if it cannot be utilised for acid mixing, is strengthened by being mixed with strong sulphuric acid, the mixture being then distilled in order to drive off the nitric acid as free as possible from water. In this operation a small quantity of weak nitric acid is again formed, which in turn must be mixed with strong sulphuric acid and re-distilled. The effect of denitration, whether carried out in denitrators or stills, is to leave the sulphuric acid practically free from nitric acid, but associated with so much water that concentration is necessary before it can be effectively re-used. The process of concentration consists in heating the acid by suitable means so that water is driven off, leaving a much stronger sulphuric acid.

Naturally a certain loss occurs both in denitration and in concentration, and this loss is obviously inevitable in the manufacture of each particular explosive. It is the object of the denitration and concentration records to show clearly the amount of this loss at every point. The denitration records therefore give the amount and composition of the waste acid treated (reckoning all lower nitrogen acids in terms of equivalent HNO_3), and the amount and strength of the nitric acid and sulphuric acid recovered. Similarly the concentration records show the amount and strength of the acid charged to the concentrators and the amount and strength of the acid produced. All these losses are expressed in terms of HNO_3 and H_2SO_4.

As in the case of the acid mixing records, considerable difficulty was experienced in obtaining consistent data. In one factory, after the major losses in the denitration of nitroglycerine waste acid had been eliminated, the efficiency of nitric acid recovery climbed very rapidly, and for a considerable period actually appeared to be slightly over 100 per cent. A careful examination into the accuracy of the measurements at all points was made, and the anomaly was finally traced to faults in the analytical method employed for the determination of the nitrogen acid content of the waste acid. So accurate and complete were the measurements that they sufficed to lead to the discovery of an inaccuracy in analysis of less than 1 per cent.

It is seen from the foregoing that the chief materials which are consumed in the acid section of a factory producing explosives are sodium nitrate and sulphuric acid. The quantities of these which are consumed in any factory per ton of explosive produced will constitute the test of the efficiency of manufacture, and the records will enable the points at which losses occur to be determined. It follows, then, that the records, if properly utilised, constitute an important factor in the control of the processes involved, and in reducing to an absolute minimum the consumption of materials for any given output.

The sodium nitrate consumed per ton of product must be determined :—(1) From the efficiency of the retorts, which produce from it the nitric acid employed in nitration; (2) from the amount of this nitric acid which is found to have been consumed for a given production.

The first factor is readily determined from the retort records. To obtain the second factor, namely, the amount of HNO_3 consumed per ton of product, it is necessary to take into consideration several details. The amount of nitric acid made in a given period may bear a very uncertain relation to the amount actually consumed during this period. To determine the latter quantity, stocks of fresh and waste acid must be taken into account, and, where nitration is carried out in more than one stage, the stocks of intermediate nitro-bodies and of the various mixed and spent acids handled at each stage must be also considered. Broadly speaking, the amount of nitric acid used will be the amount of HNO_3 in the fresh acid or acids used for nitration, less the amount of HNO_3 which is recovered by the various denitration processes, always with the reservation that due allowance must be made for variations in stocks, as mentioned above,

When the consumption of nitric acid has been determined, it is a simple matter to deduce from the retort records the amounts of sodium nitrate and sulphuric acid which are equivalent to this consumption. The sulphuric acid consumed in nitration is given by the difference between the amount of H_2SO_4 in the fresh acid used and in the waste acid recovered. In addition, any possible loss of sulphuric acid in the process of denitrating the waste acid must be determined, and, finally, the amount which has been lost in the concentration of this denitrated acid and of any other weak acid which has to be dealt with, such as that resulting from sulphur trioxide manufacture, and the weak sulphuric acid obtained from the stills in the process of converting weak nitric acid to strong nitric acid in the manufacture of nitroglycerine and nitrocellulose. With the same reservation as regards variations in stocks at all points, the quantities of H_2SO_4 lost in denitration and in concentration will be deduced from the various plant records, and when this has been done, the total loss of H_2SO_4 for a given output is readily determined.

German Owned Property

Position under the Peace Treaty

THE Board of Trade draw attention to the Order in Council under the Peace Treaty with Germany, and particularly to Paragraphs XVI and XVII, under which all property, rights, and interests within His Majesty's Dominions belonging to German nationals, *wherever resident* are charged for the purpose of securing the claims by British nationals with regard to their property in Germany and debts owing to them by German nationals. The Order provides *inter alia* :—

(1.) That no person shall transfer, part with, or deal in any way with any property, rights or interests subject to the charge without the consent of the Custodian, and that if he does, so he will be liable to a fine of £100 and three months imprisonment.

(2). That every person who owns or controls any such property including where the property consists of shares, stocks, or other securities the Company, Municipal Authority, or other body by whom they are issued) must, within three months communicate the fact to the Custodian, unless particulars thereof have already been furnished to him in accordance with the provisions of the Trading with the Enemy Acts, 1914-18, and if any person fails to do so he will be liable to a fine of £100 and

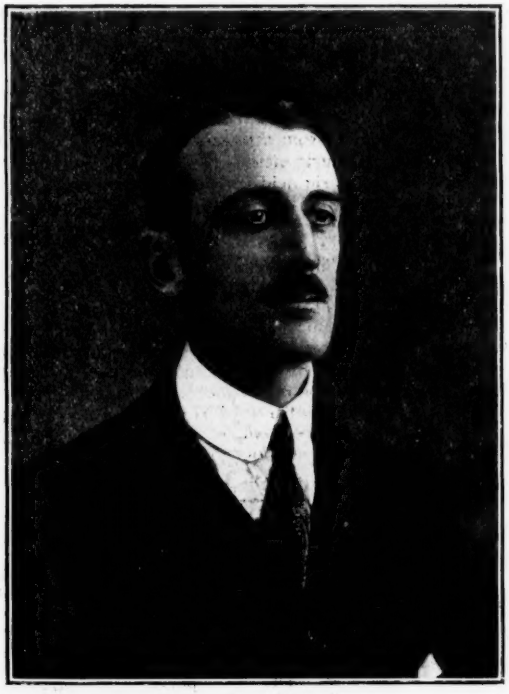
(3). That if any person is asked to pay any money or to transfer or deal in any way with any property, rights, or interests, which he has reason to suspect are subject to the charge he must immediately report the matter to the Custodian, who for England and Wales is : The Public Trustee, Kingsway, London, W.C.2; for Scotland, the Accountant of Court, H.M. New Register House, Edinburgh, and for Ireland, The Custodian for Ireland, King's Bench Division, Four Courts, Dublin.

It is pointed out that the charge does not extend to any property which may have been acquired under the Board of Trade General Licence dated July 12 last, authorising the resumption of trade with Germany. Notwithstanding anything contained in the order the Board of Trade give notice that Bankers may, without licence, allow German subjects who are resident in this country to withdraw from their balances sums not exceeding £20 in any one month.

The Chemical Industry Club: First Annual Dinner

Sir W. J. Pope's Plea for Central Chemical Headquarters

THE first annual dinner of the Chemical Industry Club on Friday evening, October 31, was an exceedingly pleasant social gathering. The hall of the Worshipful Company of Tallow Chandlers, kindly placed at the service of the club for the occasion, just comfortably accommodated the guests, and its rich old furniture and heraldic decorations were duly admired. The guests wer ereceived by Dr. Hodgkinson, the chairman of the Club Committee, and one was glad to notice many men of high commercial standing in chemical industry among them. The speaking had not quite the true after dinner touch about it; it was, perhaps, a little too serious and deliberately educational, and it inclined somewhat to length. Mr. Fergusson, who travelled from Cologne for the occasion, expressed views with which everyone agreed readily; but we should like to have heard more of what he had actually seen of German works and German processes. Mr. John Gray, genial as ever, emphasised the need of more complete unity throughout the chemical industry, and put in a kindly plea for justice and recognition for the young chemist. Sir William Pope's speech was the most charming of the evening. He did not set out on an epoch-making deliverance, but played adroitly with the topic of a headquarters for the chemical industry, and acknowledged that the Chemical Industry Club had established itself as its social headquarters. Mr. Coley, most persistent of advocates, spoke some good sense about the Club's business and prospects, and was visibly cheered by the promises of several who were guests at the first dinner to attend next year as members. One of the neatest little hits of the evening came at the close from Dr. Hodgkinson, who in acknowledging a warm reference to his own services, dryly described himself as merely a catalytic agent—something that did nothing itself but set other elements working. It was altogether a good beginning, and the dinner may now be considered one of the recognised annual functions of the chemical world.



MR. H. B. FERGUSSON
(who proposed the toast of "British Chemical Industry.")

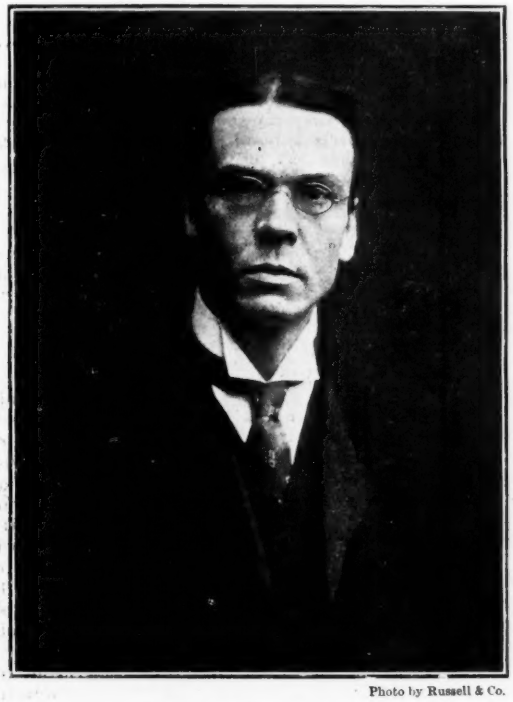


Photo by Russell & Co.

SIR WILLIAM J. POPE
(who proposed the toast of "The Chemical Industry Club.")

DR. W. R. HODGKINSON, C.B.E., presided at the dinner, and among those present were Sir William J. Pope, Mr. H. B. Fergusson (technical adviser to the Military Governor, Cologne), Mr. John Gray (President of the Society of Chemical Industry), Dr. S. Rideal (President of the Society of Public Analysts), Mr. R. B. Pilcher (Registrar of the Institute of Chemistry), Mr. Julian Baker (Chairman of the London Section of the Society of Chemical Industry), Mr. Robert Mond, Mr. A. Chaston Chapman, Mr. H. Edwin Coley (Hon. Secretary of the Club), Capt. C. J. Goodwin (Hon. Treasurer), Mr. E. J. Aldrick, Mr. E. T. Brewis, Mr. H. V. A. Briscoe, Mr. Bernard F. Davis, Dr. F. B. Dehn, Lieut. J. C. Johnson, Capt. S. Walpole, Dr. E. C. B. Wilbraham, Dr. Charles Hose, Dr. R. Lessing, Dr. E. N. Fyleman, Capt. S. Coles, Lieut. H. Baron, Dr. E. H. Tripp, Mr. T. F. Burton, Dr. F. Russell Tunks, Capt. Sterne, Mr. H. M. Ridge, Mr. J. W. Black, Mr. A. G. Craig, Dr. W. R. Ormandy, Messrs. L. J. de Whalley, S. Soloman, Heron Rogers, H. E. Burgess, T. W. Firth Clark, S. C. Radford, John Sanderson, Jules Fuerst, Wm. Macnab, L. O. Newton, Arthur Chapman, F. E. Hamer, J. A. Goodson, R. G. Fargher, N. A. Bolton, F. C. Elphick, W. R. Harding, W. G. Allen, F. E. Holland, John T. Phillips, H. J. Garnett, J. A. Reavell, M. Ockenden, Ashley Carter, T. A. Brunjes, L. Mangold, C. A. Field, E. C. Craven, William Russell, W. S. F. Rackham, Ll. J. Davies, H. Johnson, A. W. Thompson, J. D. Bishop, E. Thorpe, B. S. Green, F. A. Greene, S. J. Tungay, Harley F. Knight, Edmund A. Buckley, A. P. Lawson, A. D. Berk, E. W. Harvey, H. Gelpke, T. M. Tyson, Wm. Gregory, N. J. Bluman, P. M. Fraser, G. B. Storie, Murray, W. J. Gee, Maurice Bertault, K. C. Bolton, and Macintosh Williams.

The Chairman announced that letters of apology for absence had been received from Lord Moulton, Sir James Dobbie (President of the Chemical Society), Mr. R. Grosvenor Perry (President of the Association of British Chemical Manufacturers), Sir William Jackson (President of the Institute of Chemist), Prof. Henry Louis, Dr. Charles Carpenter, Messrs. A. J. Harvey, R. P. C. Harvey, P. E. Johnson, T. Pritchard Whelan, and Dr. P. E. Spielman.

"British Chemical Industry"

Mr. H. B. FERGUSSON, in proposing the toast of the "British Chemical Industry," said that when one reviewed the great strides the application of chemical science to industry had played during the past generation, he was forced to the conclusion that the nation which possessed the greatest chemical industry would be commercially the most prosperous and possess a weapon to ward off a repetition of such struggles as we had been through in the past five years. Having had an opportunity of living for the past nine months in Germany,

and been through a great many of their factories, and studied their methods and organisation, he felt it would be of advantage to deal with those particular phases of the industry in which our great German competitor excelled. While it was admitted that the British scientist was second to none in reasoning powers and inventive ability, we had been too content in the past to lay merely the foundation stones of almost every branch of science, without following up our discoveries and securing the most benefit from them. Particularly was that the case in the chemical industry. Until recent years we had primarily confined ourselves to the manufacture of heavy chemicals. Some twenty or twenty-five years ago the Germans realised that on account of our shipping and trade connections, they were in no position to compete with us in the manufacture of heavy chemicals, so they shrewdly turned their attention to converting their heavy chemicals into pharmaceutical products, fine chemical dyes, photographic chemicals and so forth, realising that the railway and shipping charges on those commodities were relatively a small proportion of the total cost, compared with the case of the heavy chemicals. The men who founded the greatest chemical combine in the world sank all internal individual jealousies in one great effort to make their chemical industry as a whole as perfect as possible. Factory costs, chemical yields, the results of research work, and all trade secrets were to be pooled, so that, like a team in a tug of war, they could put forth their full strength. Some of their methods, unquestionably, were not very creditable. They pursued a policy of forcing to the wall foreign competitors, by underselling them—never by buying them out—and later reimbursed themselves by putting up the price. They obtained all the advantages of the American amalgamation or trust without the disadvantage of destroying individual competition among their members, for each factory maintained its separate identity and its board of directors. They further started a world system of commercial intelligence which was one of the most elaborate organisations of its kind. If we were to compete successfully with them we must support, in order to protect ourselves, some such organisation as the Association of British Chemical Manufacturers. That Association was using, at present, the skeleton system of world commercial intelligence laid down by the Federation of British Industries, and, as our other great metal and textile industries, and so forth, were supporting the Federation, the cost that would be borne by the chemical industry would be reduced to a minimum.

The German experts and German banks had supported their chemists in the construction of some of the boldest-planned works that man had created, often with very little hope of immediate return, realising that capital which backed the application of science to industry would eventually obtain a return for its investment. As a result of Germany's support of her chemical industry, she had taken an increment of profit from the great textile industries of this country—in fact, the textile industries of the world—with her world monopoly of organic dyes; and who could say that the time was far distant when she would impose a tax on the very food we grew by the sale of cheap nitrates as fertilisers. He had been through the nitrate works where the Germans could produce 250 tons of ammonia per day and oxidise it as wanted into nitric acid or nitrates. Altogether their synthetic nitrogen plants were capable of producing about double the quantity of nitrates we had been in the habit of importing per annum from Chile.

British Chemical Organisation

In the past five years we had branched out into almost every branch of chemistry, and were beginning to realise the great mass of chemical talent we had in this country. The reason why we had allowed the Germans to outstrip us in many branches of chemical industry was the lack of appreciation of the latent capabilities of the young chemist as he left the University. These young men, as a rule, were confined in some chemical laboratory in one of our factories, where for the rest of their existence they spent the time messing with test tubes and chemical reagents, with the four walls of their laboratory to look forward to, and no hope of a just monetary return for their talents and their labour, while the works and plant were being operated too often by men with little or no technical training. Often the manufacture of heavy chemicals could be carried on, somehow or other, by men who were in no sense technical, but when attempting the demonstration of a great truth only failure would result if non-technical men were in control over the daily routine duties, and the money that had to be voted for research work and new creative plants, was so intimately interwoven with an infinite number of highly scientific problems, that they could only be successfully adjudicated upon by scientists. In Germany, often on such a board of directors, 75 per cent. of the men were scientists of the first order, with 10 or 20 years' works experience to broaden their views on administration. Some seemed to think it was the German's wonderful system of organisation which was responsible for their progress in the chemical industry. We were just as good organisers as the Germans in the metal industries and many industries to which we have applied ourselves. In mass production, and many other methods of cheap production emanating from America we were not a whit behind the Germans, but our failure in the chemical industry had been in attempting to organise it with men who were not chemists.

Chemical Administration

Having controlled some hundreds of chemists in one of our greatest national factories, he wished to say a word for the benefit of chemists engaged on administration. A young chemist coming out of the University was not in a position to control anything, and the longer he stayed in the University the more difficult it was to train him. When he came to the works he was put in a laboratory to learn the methods of sampling and analysing the principal products dealt with; he then might be put in the liaison between the laboratory and the factory, and later went on as a control chemist on the plant. Some men were, naturally, not gifted with the personality for controlling labour and administering works, and they would have to remain on research work or the study of plant use and efficiency. But the average chemist in this country was capable of being a very good administrator if he were given the opportunity. The first thing he must do was to write a complete description of his plant, and then of the method of operating, and the most important study of all should be along the lines of controlling labour. The confidence of "labour" was the first thing to be obtained by the young man who attempted to control labour, and it could be better obtained in his off-duty time than under the strict discipline existing in factory hours. We had plenty of administrators, but not chemical administrators. Administrators could teach the chemists to become administrators. It was only by the chemists combining together to support one association, and adopting some system of foreign commercial intelligence, such as that of the Federation of British Industries, and appreciating the latent capabilities of chemists and teaching them to be able to take their place in the next ten or fifteen years on boards of directors, that they could hope to do away with the many bad joints at present existing between science and industry in this country; and so weld both together, without science becoming the slave of industry, that they could face the future competition of other great nations without fear. He gave them the toast of "The British Chemical Industry." (Cheers).

Mr. John Gray

Mr. John Gray (President of the Society of Chemical Industry), replying to the toast, said he was glad Mr. Fergusson had urged the necessity of maintaining such institutions as the Association of British Chemical Manufacturers, and he hoped he also included the Society of Chemical Industry. They must, in these days, band themselves together to work for greater efficiency. The position the young chemist should occupy was the subject on which he had intended to speak. There was no doubt that there was a great deal of latent talent in the young men engaged in chemical industry and pure chemistry in our country, and if the industry was going to progress it must attract to itself the best brains in the country, but manufacturers must be prepared to offer adequate prospects to such young men. As an employer, he felt that the young chemist in the past had been neglected, and had not only not received monetary encouragement, but had not received the encouragement of advancement which he ought to have had. There was a great deal too much standing aloof from these young men by those who had already made their position. They should not patronise the young chemists, but help them forward. He could conceive of no better method of doing so than a club such as the Chemical Industry Club. The technical staffs in the factories should be encouraged to meet together, so that they could give expression to their views in conference, and of the general trend of investigations. Tried, trusted and promising young men should be taken into the deliberations of the senior administrative staff for the purpose of learning what was involved in the management work. The days of exclusiveness in these matters were over. The encouragement of new ideas amongst the younger men should be actively taken in hand, and such ideas should be suitably rewarded.

"Chemical Industry Club": Sir W. J. Pope

Sir William Pope, in proposing the toast of "The Chemical Industry Club," said that during the last few years we had realised more than previously that unity amongst chemists was a vital factor in securing proper recognition that their subject was one of national importance. It had been customary among chemists—he meant not only pure chemists, like himself, but also "impure" chemists like most of those present—(laughter)—to gather in small knots of people interested in a small aspect of the subject and to form separate societies and act apart and independently of the whole great subject. That did not diffuse effort, and it wasted a great deal of time. It meant in the end that the chemists did not pull the weight they should in the counsels and industries of the nation.

At the present time when they were all convinced that our Empire was entering upon a period of technical and industrial prosperity which had never been equalled, they should take stock of the situation and see what they were going to do in the future. They ought to act together as chemists, whether on the one side or the other, for the purpose of seeing that their profession took its proper place in national affairs, and to see that they all got a proper remuneration for their efforts. He meant more particularly people like himself—the pure chemist—(laughter)—because he thought the applied chemist had been more or less properly remunerated, and he had no doubt he would secure a fair dividend in the future.

There were several ways in which they could carry out the sort of plan he had very hazily sketched. They might inaugurate a body which would bring together the whole of their great societies interested

in chemical affairs. Such an organisation was, in fact, in being and was gradually and slowly and painfully emerging. The National Chemical Federation was in existence, and consisted of members of the fifteen or so societies intimately concerned with chemical matters. Upon that Council all those societies were represented. They had held many meetings and had done some good, but hoped to do a great deal more. That, however, was starting the business at one end.

The Need of a Social Centre

To start it at the other end, some sort of social organisation was needed which would bring together all the chemists, men of different types and different modes of thought, and that was the function of this Chemical Club. When he heard a year or more ago that a club of that sort was projected he did not feel particularly sanguine about its success, but he confessed that he had judged his fellow-chemists wrongfully, and he congratulated the founders of the club upon the ability they had shown in reading the signs of the times. What they wanted to see was chemistry standing as a great profession, equal to the law—almost equal to the Church—(laughter)—and taking its proper part in all the activities of the Empire. The two methods he had mentioned of tackling the problem were complementary. They required for the housing of chemistry a building far more palatial than anything they had. The accommodation was negligibly small before the war. The Chemical Society had a house which was far too small, and the Society of Chemical Industry had merely offices—it had no proper meeting-place; the Institute of Chemistry had a fine building, but if it expanded its activities considerably that building would be hopelessly inadequate. Chemists wanted a building in a central site in London comprising sets of lecture theatres for public meetings, and suites of rooms which could be used for offices for all their chemical societies, and they wanted a library far more exhaustive than the library of the Chemical Society. For the purely academic activities of chemistry they required a social organisation which would bind the whole together, and that organisation they were able to find in a club like the Chemical Industry Club.

The Nation's Debt to Chemistry

A scheme of the kind he had mentioned might cost a quarter-of-a-million, but during the last few years chemistry had saved the nation expense incomparably greater than that. He appealed to those present to take every occasion to preach the services chemistry had rendered the nation, in the hope of getting from the nation financial aid for the building of their premises and other purposes. They should take every opportunity to induce the great corporations of the Empire that had become flourishing through the practice of technological chemistry to loosen their purse strings and help in carrying out the scheme. They had in the summer of this year a considerable meeting of representatives of chemistry from France, Belgium, and Italy, for the purpose of laying the foundation of an Inter-Allied Conference in chemical research. That conference was held partly in London, partly in Paris, and partly in Brussels; and he attended the meetings at the three centres. The meetings in London were much more successful than the others, because the programme had been thought out carefully beforehand. They met the delegates in the morning and they were entertained to lunch, partly by the Chemical Club and partly by one of the City Livery Companies, and went back and voted everything in a spirit of unanimity, largely due to the hospitable spirit inculcated by that club. (Laughter.) Their French colleagues were anxious to eliminate neutrals, such as the Dutch and the Swedes; but international chemistry could not be conducted in that way. The Italians wanted Italian to be one of the official tongues, and spoke Italian, though no one present besides the Italians understood it.

A good friend of his, a technical chemist, who, unfortunately, was no longer with them, endeavoured for some ten years to induce him to enter technical work—which would have been a bad thing for the industries of this country—(laughter)—and explained to him his ideas of the qualification of a technical chemist. In the first place, a technical chemist should be a classical scholar (his friend was an extremely good one). The technical chemist as they turned him out of the University (he wished he could turn more out, as he had over a thousand doing practical work in his laboratory) should, in the opinion of his technical friend, have a complete command of mathematics and book-keeping, and he should possess a great deal of tact in handling workmen; but how could he obtain it in a University? He should also be a presentable person, who could appear before a board of directors and stand being bullied, and hold his own and walk out triumphant. If the technical and scientific people talked these things over in a good club, such exaggerated views would disappear. It gave him great pleasure to propose the toast.

Mr. H. E. Coley

Mr. H. Edwin Coley (Hon. Sec. of the Chemical Industry Club), replying to the toast, said that as Secretary of the Club during the past fifteen months, he had had more opportunities than previously of learning about chemists and those occupied with the chemical industry, and he had come to the conclusion that the stigma cast upon chemists and the chemical industry before they started that club—that they were not clubable—was entirely incorrect. He believed that until this Club was started the chemical industry was the only one which had not some club to call its own in England. In appealing for increased support for the club, he said that they had amongst their members laboratory names and the names of manufacturers of note; but they had not all the manufacturers—all the leading chemists. Their club was, he thought, the cheapest in London, and it was one which the leaders of the profession should support, because it gave an opportunity for the young men they were likely to employ to widen their minds in such a way that they would become of greater value to those employing them. The club had a subscription low enough to enable any chemist, even in that badly-paid profession, to join it; it was a fully fledged club in every sense of the word. It was not a centre of chemical political intrigue, but a club in which the members could feel, when they entered it, that they left behind them their shop, if they wished; and their worries, if they had any; and, finally, it was a club which no one could say was used by its members as being a sort of secret society which was going to upset all other things in the chemical world. When the time came for the national movement (to which Sir William Pope had referred), and it was properly installed and provided a suitable club of sufficient dimensions to rank with the chemical industry generally, then this club was prepared to merge its interests in the national interests. He thought they might justly ask their leaders to come forward and say, "This is a right thing and should be supported, and we will put our names down on the list of members."

Mr. H. M. Ridge, proposed the toast of "The Worshipful Company of Tallow Chandlers," to which Mr. F. Cooper (Deputy Master of the Company), responded.

The toast of "The Guests," proposed by Mr. Bernard F. Davis, was responded to by Dr. Samuel Rideal and Mr. Julian Baker, both of whom expressed their intention to become members.

The Chairman, in acknowledging the toast of his health, proposed by Mr. Coley, described his position on the committee as that of a catalytic agent—which did nothing itself but made others work.

Society of Chemical Industry

Opening Meeting of the London Section

Mr. Julian L. Baker, the new Chairman of the London Section of the Society of Chemical Industry, presided over the first meeting of the 1919-20 Session on Monday, November 3, when two papers were read. The preliminary business included the announcement that Dr. Charles A. Keane, the immediate past-chairman, had been appointed a vice-chairman, and the passing of a vote of thanks to Dr. Keane and Dr Stephen Miall for the manner in which the arrangements for the annual general meeting of the Society in London were carried out.

Black Lead Pencils

The first paper was on "Black Lead Pencils and their Pigments in Writing." Prior to the discovery of graphite, it was pointed out, pencils were composed of metallic lead or alloys of lead, which were cast into a suitable shape and wrapped in paper holders. Graphite was first discovered at Borrowdale in Cumberland in 1560, and from that time until the latter half of the eighteenth century the black pencils used all over Europe were derived from the Cumberland mine. About 1840 the Borrowdale mine, which at first was only worked for a few weeks in the year, but later more continuously, showed signs of exhaustion, and various methods of utilising the graphite dust in the works were tried. In 1869, however, Cumberland graphite was finally exhausted, and composite pencils came into general use. Faber's works were established at Nuremburg in 1761, and mixtures of powdered graphite, sulphur, resins, gums, and other ingredients were used, but the modern process of pencil manufacture originated in 1795 with Conté, of Paris. This process consisted of mixing finely elutriated clay and graphite into a paste, which was forced through mould openings in a cylinder, so as to produce circular threads of pigment. These were dried, heated in a covered crucible, and glued into the grooves in wooden holders. The hardness of the pencil depended upon the proportion of clay and the degree of baking. This process was introduced into this country early in the nineteenth century, and overlapped the older process. Wax was subsequently incorporated with the pigment, this dating back to 1840. Various other additions, such as lamp black, sulphur and resin, have from time to time been incorporated with the graphite composition.

Considerable statistical information was given as to the composition of various graphites for pencil making, as well as the results of analyses of many specimens. Illustrations were also shown of the microscopical appearance of the marks made by the various graphites. The percentages of carbon, ash, silicates, iron and alumina were given of a series of graphites, including Borrowdale, Ceylon, Swedish, Greenland, Canadian, Siberian, and Acheson's (the latter both for pencils and electrodes). The highest percentage of carbon was found to be in Acheson's pencil graphite, viz., 99.83 per cent.

In judging the suitability of graphite for pencil making, the chemical points to which attention should be directed are (1) the proportion of carbon, (2) the amount of silicates, (3) the iron. The physical nature of the graphite also plays a part, and specimens of Borrowdale graphite

poor in carbon have been found to give far better results than specimens of more crystalline graphite containing more carbon. The paper went at some length into the microscopical examination of pencils, and discussed methods for analysing pencil pigments.

Discussion

PROFESSOR J. W. HINCHLEY, speaking from the inside of the actual manufacturing pencil trade, thought the author had fallen into one or two errors in that connection. The manufacture of the modern lead pencil was a long way removed from the Conté process. Reference might have been made to English workers in the early period in connection with methods of producing cheap graphite blocks, and he believed an old press which was used at Woolf's works for compressing powdered graphite still existed. Spermacetti wax was at one time used, but its high price was now against it. The pencil industry, however, was a secret industry, and he must not talk too much about it. He did not know any maker who produced now a pencil equal to the old-fashioned Borrowdale graphite pencil.

DR. W. R. ORMANDY said that the scratches made by pencils were due to the silica in the clay. The siliceous matter could, to a very large extent, be removed from the clay by washing, using 97 tons of water to three tons of clay, but even then there was still a large amount of siliceous matter present, leaving the clay exceedingly coarse. One clay found in an East Prussian claypit was of such a low quality that it was only used for the manufacture of drain pipes, but by means of an electrical arrangement it had been possible to separate the clay from the remaining matter, so that whereas it originally fetched only 6s. per ton, the German pencil manufacturers purchased it at £30 per ton during the war. An additional advantage of the process was that the clayey substance, carrying a fairly heavy electro-positive charge, had the power of absorbing dyes to a degree which was absolutely unequalled by any of the ordinary or natural clays.

PROFESSOR J. W. HINCHLEY said that artificial graphite was almost impossible as a pencil making graphite, owing to its high cost.

MR. MITCHELL, in his reply to the discussion, said he was in blank ignorance of the methods used in pencil manufacture to-day. His information had been obtained almost entirely from Mr. Birkbeck, the former proprietor of the Greta Pencil Works, of Keswick, and he had told him that in many cases his works did not employ the modern processes. However, he was now concerned with the result produced by the pencil on the paper. As to the unsuitability of graphite, he had received pencils from Messrs. Acheson of excellent quality.

Shawinigan Chemical Industries

The second paper, by Captain E. T. Sterne, dealt with the Shawinigan Chemical Industries of Canada. Until 1898, he said, Shawinigan consisted of a forest wilderness, but enormous strides had been made since then, when the Shawinigan Water and Power Co. took out its charter. At the Falls alone there are now over 200,000 h.p. in use, and in all some 1,000,000 h.p. will eventually be available. With such a vast amount of cheap electric power it was not surprising that a large number of chemical industries had ranged themselves around the Power Company. In most cases they are offshoots of the Shawinigan Water and Power Co., and in some instances had been the direct outcome of the war, particularly the synthetic acetic acid and acetone plant of the Canadian Electro-Products Co. This is probably the most interesting chemical development at Shawinigan, and one of the most notable achievements in the chemical world during the period of the war. During 1915 the demand for acetone by the British War Ministry became so great that the old sources of supply from calcium acetate were quite insufficient to meet the demands for cordite manufacture. Towards the end of the year the British authorities approached the Power Company at Shawinigan as to the possibility of manufacturing acetone from calcium carbide. Five Canadian chemists were put to work, with the result that in March, 1916, the plant was started, and by January, 1917, the first shipment of acetone was made.

The process is divided into five stages, viz., (1) production of acetylene from calcium carbide, (2) production of mercuric oxide from metallic mercury, (3) production of acetaldehyde from acetylene, (4) oxidation of acetaldehyde to acetic acid, (5) conversion of acetic acid into acetone. The difficulties encountered in the laboratory were found to be even greater when the large scale experiments were undertaken, but they were eventually overcome, and over a period of some months the average efficiency of the process was 85 per cent. The acetone manufactured was of the highest grade of purity, and satisfactorily passed all Government specifications. During the latter part of the war the last stage of the process was dropped, and from November, 1917, to the close of the war acetic acid only was produced. The demand for this was almost doubled when the United States entered the war, and a duplicate plant was put in hand and completed, when the Armistice was signed.

Among the other chemical works at Shawinigan are the Canada Carbide Co., which was started in 1903, and has a capacity of 200 tons of carbide per day. The Shawinigan Electro-Metals Co. is a war concern, and came into existence through the shortage of magnesium metal for war purposes, and the plant is now being developed to meet industrial requirements. The Canadian Aloxite Co. is a subsidiary of the Carborundum Co., of America,, and is manufacturing abrasives of various kinds. The Canadian Ferro-Alloys Co. has recently completed a plant for the manufacture of ferro-silicon and other ferro-alloys; another concern, the Prest-o-lite Co., manufactures compressed acetylene gas, and the Canadian Electrode Co. is manufacturing carbon electrodes.

There was no discussion on the paper, but, in proposing a vote of thanks to Captain Sterne, the chairman said that the manufacture of acetone in this country by the fermentation process must be regarded substantially as a failure.

Dr. Keane and Mr. G. Patchin exhibited a clip for preventing rubber connections from slipping off glass and metal tubing, and for attaching pressure pumps to taps, etc.

Professor Bone on Fuel Economy

No Central Monopoly of Research

AT the first meeting of the session of the Newcastle Section of the Society of Chemical Industry on Monday week, Professor W. A. Bone gave an address on the second report of the British Association Fuel Economy Committee.

In dealing with the question of the organisation of the research work on the chemistry of coal, Professor Bone said that a good deal of very valuable research work upon the chemistry of coal had been carried out in this country by individual investigations with very inadequate resources in the way of apparatus and assistance, and the committee had made it its business to arouse public opinion upon the importance of greatly augmenting facilities for such work throughout the whole country. It had come to their knowledge that foreign buyers of British coal were often more familiar with its chemical characteristics than we were ourselves and that a chemical survey of our coalfields was fast becoming an urgent necessity. The Chemical Sub-Committee, which, under the chairmanship of Dr. J. T. Dunn, Newcastle, had considered this matter in 1915–16 reported that inasmuch as the organisation of systemaic investigation upon the chemical character of the principal British coalfields would involve considerable labour and expense, they were of opinion that the resources both of existing laboratories which had been established within recent years in the country for the special investigation of fuel problems and of other laboratories where the technique of the subject had been developed, might be utilised more than they were at that time, and that the time was ripe for the organisation of a scheme of systematic co-operative research, aided by national funds in which all such laboratories might participate. In a word, they had advanced a national provision for coal research on " free trade " lines.

Unfortunately, however, when the Fuel Research Board was set up by the Department of Scientific and Industrial Research, a very different policy was inaugurated which aimed at centralising coal research in one State-owned central laboratory, thus " monopolising " the work. In view, however, of the vastness and complexity of the problems which the nature of coal presented to the chemist, the Committee felt that it was essential that the subject should not be centred in one laboratory or be placed in the hands of one person no matter how eminent he might be.

In the second report the Committee had expressed its dissatisfaction that " no attempt has apparently yet been made to organise any such comprehensive scheme as was recommended in 1916," and it wished again to impress upon the public and the Department of Scientific and Industrial Research the danger of sterilising fuel research by a policy of over-centralisation ; on the contrary, it was of opinion that what was most needed was a broadly-planned policy which would aim at stimulating and assisting experimental work on the chemistry of coal, fuel economy, and cognate subjects everywhere throughout the whole kingdom. In this connection Professor Bone thought that the department of Scientific and Industrial Research had unfortunately become obsessed by the fear of what it called overlapping. He thought that the first duty before chemists was to represent to the department the necessity for a considerable amount of overlapping of research work if they wished to get at the truth concerning the chemical nature of coal, and to lay a good foundation for future progress. Anyone who had studied the history of chemistry would be able to call to mind innumerable instances in which the truth had been revealed and progress made only as the result of much controversy and overlapping. The attitude of the Department of Scientific and Industrial Research and of its Fuel Research Board seemed to him to be in this respect detrimental to true progress. In this,

as in other matters, he was an unrepentant free-trader and he would oppose any attempts at creating research monopolies subsidised by public funds, and he hoped that chemists and the public generally would see that a more enlightened policy would prevail in the future.

Professor Louis on the Output Problem

PROFESSOR HENRY LOUIS, who opened the discussion, said that the steady diminution of output was a very grave question. Production to-day was about two-thirds of what it had been at our best, but a word of warning was needed on the methods of compiling the statistics. Production per man per annum was not a good way of looking at the matter. When trade was slack, shipping inadequate, railway facilities short, and the pits, instead of working eleven days a fortnight, for six months of the year only worked seven or eight, the men might be doing their best and perhaps better individually than at other times, but because the pits had been idle the annual production would appear to go down. The only fair criterion was production per man per day actually worked. Unfortunately our statistics had been so shockingly kept that we could not possibly get at it in that way. Things were better in that respect than a few years ago, mainly, he thought he might say, as a result of some criticisms of his own which had succeeded in getting faulty methods corrected. The broad conclusions, however, that production was falling off was one they could not get away from. The reasons were many and complex. Personally, he considered that that stupid Act, the Minimum Wage Act, had had a serious effect on output. It had been described by a North country miner as "the minimum wage is what you get for going down, and if you want more you have to work for it." That Act, coupled with the recent rises in wages, had had an effect on output. It was not that the men were not capable of working or that our seams were being rapidly exhausted. Until the present minimum wage system was remedied we were not likely to do much better. The outlook was exceedingly grave. We were faced with a gradual diminution of output because we were the oldest coal-producing country, with the result that our best and easiest wrought seams were being worked out, and we had to work thinner and poorer seams. It could be made up to a certain extent by machinery. Machinery was increasing the output in new countries, but the introduction of machinery in this country was not keeping pace with the fall in output. He thought Professor Bone had suggested that output could be increased by the use of more machinery as in America. He did not believe it. He believed there were very few places in the country where coal-cutting machinery might be introduced in which it was not already in operation to-day. He had been in a Yorkshire pit recently where the output was 3.53 per man with machinery and 3.5 with hand hewing. Obviously in conditions like that machinery was not going to help. The only thing was to get a healthy feeling among the coal producers; to get them to see that it was to their advantage, and to the advantage of the nation at large, that they should do as much as possible instead of as little as possible. To increase the output and economise on the product were the two great coal problems they had got to solve.

Inadequate Chemical Knowledge of Coal

DR. J. T. DUNN said he agreed with Professor Bone on decentralisation, and held that whatever Government money was spent on research should not be confined to the central official organisation. He could bear out Professor Bone's contention that foreign buyers knew more about the chemical properties of British coal than we did ourselves. He was almost ashamed to say that a Russian scientist at an International conference had been able to give him more information than he could give the Russian on the coal of Northumberland and Durham.

DR. J. E. PATERSON said that, in common with all chemists, he had felt badly handicapped by want of knowledge of our own coal. It was almost impossible to go to the buying departments and ask for certain coal, because it was most suitable for a certain purpose because they did not yet know sufficient about it. He felt the necessity for long and exhaustive research on the fundamental properties of coal. That centralisation in investigation was a mistake he was certain, and went on to describe the experiences of the American central investigation departments which had a tendency to become too much under the influence of one or two very clever men. Different points of view were very necessary in arriving at the truth. In British and American steel practice there were very divergent opinions amongst men of equal ability, and the controversies that ensued were of great benefit.

Chemists at Jarrow Ironworks

A Visit by the Newcastle Section

ON Thursday, October 30, about fifty members of the Newcastle Section of the Society of Chemical Industry, paid a visit to Messrs. Palmers' Iron and Steelworks at Jarrow-on-Tyne. The visit was one of the most interesting in the history of the section. The members were shown over the works by Mr. Hewitson Hall (works manager), Mr. T. H. Pearson (engineer), Mr. J. H. Ridsdale (blast furnace manager), Mr. C. W. Hewson (chemist), Mr. J. Knowles (mill manager), Mr. W. G. A. Roberts (electrician), and Messrs. W. Hargest and D. Rogers (of the works laboratory). The party visited the gas engine house, where four very large gas engines are run entirely by the waste gas from the blast furnaces. The engines drive the electric generating plant which provides electric power, not only for the works, but for the shipyard. The visitors examined the gas cleaning house, where the gas from the furnaces is cleaned by a "shaking" plant. The flue dust collected in this way is rich in the yield of potash and, indeed, the supply of potash is a considerable source of revenue at the present time. From the cleaning house the party went to the blast furnaces, where tapping operations were in progress, the molten iron in a forty ton ladle going straight from the furnace to the mixer in the steelworks in this case. As a new basic furnace is in course of construction at the steelworks, the members had an excellent opportunity of examining the details of furnace construction. The soaking pits, put down during the war, were next inspected, and from there the party proceeded to the cogging and bar mills. A visit to the engine works concluded a most interesting tour of one of the greatest and most progressive works on Tyneside.

Later, the party were entertained to supper by the company, and Mr. Hewitson Hall presided. On the motion of Dr. J. H. Paterson, seconded by Mr. W. Jones, a hearty vote of thanks was accorded Mr. Hall and his assistants for their kindness.

Chemistry and Industrial Progress

Mr. Hall said it was most gratifying to find such a large body of ladies and gentlemen so much interested in chemistry as applied to industry. It was becoming increasingly evident that the progress of industry, and progress even outside industry, lay largely in the field of chemical research. In the iron and steel industries they had been forced by circumstances to probe deeply into the chemical aspect of every matter which was to undergo reorganisation. Before the war it was difficult to get people to spend money in making scientific researches in industry at home. However, their efforts in that direction had met with success, and the object they had set out with—to save fuel and labour costs—had been more successful than they expected. He referred to the great success of the utilisation of waste gas from the furnaces which had hitherto just gone into the atmosphere but which was now the motive power of the tremendous engines they had seen that night. They had a long way to go yet, and during the next five years the economical development of the production of iron and steel would have to be pressed forward to meet the competitors in America in the markets of the world.

Colorimetry in Technical Analysis

Paper by Mr. E. Turner, B.Sc.

MR. J. W. Martindale presided, on Saturday, November 1, at a general meeting of the Newcastle and District Section of the National Association of Industrial Chemists, at which Mr. E. Turner, B.Sc., read a paper on "Colorimetry in Technical Analysis."

The Secretary, Mr. E. P. Lumley, reported on the proceedings at the National Council Meeting of the Association, and after receiving his report a resolution was passed recording the Association's appreciation of the services of Mr. E. J. Thackeray, who had resigned the position of general secretary. Mr. E. L. Burt was elected a member of the Council of the Section. It was announced that a dinner would be held in January, which it was hoped would become an annual function.

Methods of Colorimetrical Tests

Mr. Turner began by describing colorimetry as a method of technical analysis or determination which depended upon the matching of colour tints. The method was employed almost exclusively in the determination of extremely minute quantities of substances, and as most of the substances were dyes and poisons, the method of determination was bound to be one of strictest accuracy. He claimed that colorimetry was not only accurate but direct in result. As it was frequently only a matter of matching a colour against a standard and the multiplying of the standard equivalent by a simple multiple, it would be seen that the result was quickly gained. There were three ways of carrying out tests colorimetrically. Where the colour could be obtained upon a strip of paper it was better to match the colour obtained against a series of standards previously prepared.

Where the colour could not be obtained in that way but only in solution, the method adopted was to obtain a colour with certain quantities of re-agents and the test substance; then, using the same quantities of re-agents, another solution was prepared without any test substance. A standard solution of test substances was then added to the second substance until a depth of colour similar to the first was obtained. The amount of substance in the standard solution added was the required test. The third method involved the use of colorimeters, and of those he considered the Mills to be by far the best and most extensively employed.

Conditions Necessary for Success

Dealing with the conditions necessary to the successful application of colorimetry, Mr. Turner said that colorimetry was founded on the fact that selective colour absorption was constant in a given substance so long as the physical and other conditions remained unchanged. The conditions were a normal light, a common colour standard, a normal vision, and a substance with a characteristic colour. He described the conditions. Normal light was made up of the six spectrum colours and daylight was the nearest approach to that. Diffused daylight enabled determinations to be made with greater accuracy than bright sunlight. The use of the Lovibond chart was of great assistance in describing by letter and number the exact shade and tint of colour obtained. It was obvious that normal vision was necessary, although an experimenter suffering from colour blindness to a limited degree might carry out useful work providing his infirmity remained unchanged. He added that it was important to take into account the colour given by the water used to effect a solution.

An interesting description of apparatus, illustrated by diagrams followed before Mr. Turner proceeded with the application of colorimetry. One of the most important colorimetric tests in an alkali works was the estimation of arsenic in rectified oil of vitriol. The acid had been de-arcinated, but frequently contained very small quantities of arsenic, iron and nitric acid, all of which were estimate colorimetrically. The three methods of estimating arsenic were by Marsh's test, which was accurate though long and tedious, the production of arsenic sulphide, and Gutzeit's tests.

The Chairman, Messrs. Hargest, Rodgers and Hord contributed to the short discussion which followed, all bearing out a great deal claimed by Mr. Turner for colorimetric analysis.

Research in Non-Ferrous Industries

A Co-operative Laboratory Experiment

WITH a view to bringing science and technology into closer application to industry, an interesting pioneer scheme on a co-operative and non-profit basis, for which about ten Midland firms, using mainly non-ferrous metals, are responsible, has recently been inaugurated in Birmingham, and chemical and physical laboratories have been established. By means of this co-operation a system of scientific control has been organised by the Midland Laboratory Guild to meet the requirements of the firms without attempting to instal separate laboratories in each individual works, and very little outside work is done.

The organisation is in the form of a company registered under the Board of Trade, and limited by guarantee. The objects as set out in the Memorandum of Association runs as follows:—"To promote, maintain and control scientific work in connection with the non-ferrous trade or industry, and also any other metal trade or industry carried on by any one or more members of the Guild for the time being; to establish, equip, and maintain chemical, metallurgical, physical and mechanical laboratories to carry on the work of analytical and metallurgical chemists; as also the physical and mechanical examination of metals and metallic alloys, and of all substances and processes carried on by any member of the Guild in his trade or manufacture." The equipment provides for (1) a complete chemical laboratory fitted with every necessary appliance, and affording special facilities for electro-chemical methods of analysis and for the examination of fuels and refractory materials, to which subjects considerable attention will be paid; (2) a metallographic laboratory fitted with one of the latest and most complete types of photomicrographic apparatus, together with photographic dark room; (3) a physical testing laboratory, the plant of which consists *inter alia* of a 25-ton Olsen testing machine, with all modern fitments, a Brinal hardness testing machine, Sankey bend testing apparatus, a 5-inch Drummond lathe, drilling machines, &c.; and (4) a pyrometric laboratory equipped for calibrating and testing thermo-electric pyrometers, effecting repairs and adjustments. The apparatus includes reflecting galvanometer and potentiometer, with a sensitivity of one-ten-millioneth of a volt. One room has been set apart as a scientific library.

The administration of the laboratory is in the hands of Mr. Seymour Pile, M.A. (Camb.), with a committee or a board of directors, consisting of one member approved by each firm constituting the membership.

Canada's Chemical Industry

Enormous Impetus Given by the War

THE enormous impetus given to the Canadian chemical industry, due to exceptional demands during the war, is shown in a report issued by the Dominion Bureau of Statistics, prepared for the Honorary Advisory Council of Scientific and Industrial Research. This report contains a directory of Canadian chemical industries, with names, addresses and products of firms whose products are either chemicals or are the result of processes involving chemical change. The number of plants operated is given as 634, 161 of which are situated in the Province of Quebec. The outstanding progress made during the war was probably the construction of the world's largest glacial acetic acid plant at Shawinigan, Quebec. An entirely new process beginning with acetylene was developed; while acetone, paraldehyde, crotonaldehyde, mercuric oxide and manganese acetate are now also produced, and magnesium of a purity ranging from 99 per cent. to 99.9 per cent. is made electrolytically from its fused salts. The following figures show the increase in value of exports of Canadian drugs, dyes and chemicals during the fiscal years, March 31, 1912-19: 1912, $1,677,216; 1913, $1,800,437; 1914, $1,730,203; 1915, $3,543,701; 1916, $6,449,145; 1917, $9,218,415; 1918, $14,207,609; 1919, $17,053,074. The imports for consumption of drugs, dyes and chemicals into Canada in the last fiscal year amounted to $32,788,704, of which $28,785,191 represents the value of chemical products imported from foreign countries, and $4,003,513 the value of such products imported from British markets.

Benefactions for Research

MR. P. A. MOLTENO and his wife have made an offer to the University of Cambridge of £30,000 for the erection and maintenance of a suitable building to be used as an Institute for Parasitological Research in the University, providing that the University finds the site.

The gift of a further £2,000,000 to the Rockefeller Institute by the founder, Mr. John D. Rockefeller, is announced. The institute, which was founded in 1901, has become the largest endowed establishment in the world for medical research. It had already received from Mr. Rockefeller successive gifts to the amount of £5,500,000, and real estate valued at £500,000. The scientific staff numbers sixty-five, and in addition there are 310 persons employed in technical and general services. The latest gift will enable research to be conducted in new fields in biology, chemistry, and physics, as well as in medicine itself.

Oilfields of Athabaska

IN DESCRIBING the oilfields of Athabaska in the *Montreal Gazette*, Mr. C. F. Law, of Vancouver, says that there are at least 30,000 barrels of oil per acre over an area of 40,000 acres. He also remarks that so far as this claim of oil wealth in the Great North-West is concerned, modern discoveries are only confirming the belief of a past century. An old map of that territory, dating back one hundred years, shows the route taken by Sir John Franklin's expedition to the Arctic regions. This was by way of Hudson Bay, and this map, prepared by Sir John Richardson, the scientist of the expedition, bore the words "petroleum and slag mineral patch" on the ground referred to. Another map, nearly forty years old, drawn by the Geological Survey Department of Ottawa, bears similar references in regard to Pierre au Calumet, being marked "tar sands, 100 ft. thick."

Recent Wills

Mr. W. M. Crowther, of Field House, Gomersall, Yorkshire, retired manufacturing chemist. Net personalty £17,856 .. £22,532

Mr. P. Strang, of Perth, chemist £11,741

Mr. W. H. Edwards, of Hill House, Sketty, Swansea, steel and tin plate manufacturer, of the Duffryn Steel & Tin Plate Works, Morriston, Swansea. Net personalty £491,444 .. £770,597

From Week to Week

PROFESSOR C. R. DARLING, A.R.C.S., gave a lecture, illustrated by experiments, on "Heat" to the staff of the Anglo-Mexican Petroleum Co. last week.

DAMAGE ESTIMATED at fifty-thousand pounds was caused on Wednesday by a fire at Roughcastle fish guano works, near Falkirk.

MR. MAURICE COOK, B.Sc., who graduated with first-class honours in metallurgy in July last and was awarded the Leblanc medal, has been appointed Assistant Lecturer in Metallurgy at Manchester University.

IN ORDER TO make Switzerland less dependent on imports, the Schmidt-Roost Oerlikon Company have established a steel foundry, where scrap iron is converted into steel in electric furnaces.

MR. C. F. CHANCE, son of the late Mr. Alexander Chance, and well-known in the chemical industry as the managing director of Chance & Hunt, Ltd., Oldbury, has been elected a member of the Birmingham City Council.

THE WAR RISKS INSURANCE office, at 53, Cornhill, E.C., has been closed, and all correspondence should now be addressed to the War Insurance Accounts Branch, Board of Trade, Gwydyr House Annexe, Whitehall, S.W. 1.

THE DEGREE OF Doctor of Science (chemistry) has been awarded by the Senate of London University to Mr. E. K. Rideal, University College (who recently left England for the United States); and that of Bachelor of Science (chemistry, first-class honours), to Mr. F. L. Allen, East London College.

IT IS STATED that Colonel Sir Charles Allen, V.D., owing to continued ill-health, has resigned the chairmanship of the Ebbw Vale Steel, Iron and Coal Co., Ltd., and that Mr. Frederick Mills, having resigned his position as managing director, has been appointed Chairman.

ON WEDNESDAY, A "SUNBEAM" touring car and "Triumph" motor-cycle completed a 10,000 mile tour, organised by the Automobile Association, to test the efficiency of benzol as a motor fuel. A full report on the results of the experiment will be issued shortly.

AT A MEETING of the Chemical Advisory Sub-Committee held in Glasgow last week, in connection with the Glasgow British Fair to be held in February next, steps were taken with a view to organising a large and comprehensive chemical section. Several well-known firms in the chemical industry have decided to take space.

PROFESSOR G. G. HENDERSON, on the occasion of his appointment to the Regius Chair of Chemistry in Glasgow University, on Friday, October 31, received a presentation, including a silver rose bowl and silver afternoon tea kettle, from past and present students and staff of the Chemistry department of the Royal Technical College.

SHORTLY BEFORE MIDNIGHT on Thursday, October 30, fire broke out on premises occupied by the Beck Cinematograph Manufacturing Co., in Wardour Street, the centre of the film-producing industry in London. The outbreak was confined to one storey of the building, but a number of films and other cinematograph apparatus were destroyed.

SIR JOSEPH COOK, in the course of a speech at Sydney on Monday, disclosed the existence of a new partnership between the Imperial Government and the Commonwealth for the more efficient exploration of the Papuan (New Guinea) oilfields. The Imperial Government grants the Commonwealth £50,000, and selects the borers.

A CIRCULAR, dated October 22, received from the McGraw-Hill Co., with reference to the temporary cessation of their publication, *Chemical and Metallurgical Engineering*, states that, at the time of writing, there was no immediate prospect of a settlement with the printers' strike, although conferences were being held almost from day to day.

THE OPERATIVES' AND EMPLOYERS' representatives in the allied bleaching, dyeing and finishing trades in Lancashire, Cheshire and Derbyshire, met in Manchester, on Wednesday, in connection with the employees' demand for an increase in the basic rates of wages. No settlement was arrived at, and negotiations will be resumed on Monday next.

THE OPERATION OF THE TURPENTINE, ETC., Control Order, 1918, is suspended on and after November 1, until further notice, in so far as it relates to turpentine substitutes, namely, mineral turpentine, white spirit, white oil, or any product of petroleum under whatever name sold or known (except motor spirit and benzine) capable of being used as a substitute for spirits of turpentine.

AT A CONFERENCE on the Trade Marks Bill, held at the London Chamber of Commerce on October 14, the effect of the phrase, "any single chemical substance," in line 27, was discussed, and it was agreed to address a letter to the Comptroller of Trade Marks, asking him to accord an interview to representatives of the Chambers of Commerce and other associations concerned in the effect of this clause; and to obtain, if possible, a clear definition of the phrase, "single chemical substance."

AT A GENERAL MEETING of the members of the Royal Institution on Tuesday, Sir James Crichton-Browne, treasurer and vice-president, in the chair, the special thanks of the members were returned to Mr. Richard Pearce for his donation of £100 to the fund for the promotion of experimental research at low temperatures; to Mr. Robert Mond for his gift of laboratory material; and to Sir Humphry Davy Rolleston for his gift of a drawing of Sir Humphry Davy's birthplace and a water-colour of his statue in the Market Place, Penzance.

MR. S. M. PROKUDIN GOIST, a Russian, who has been engaged for some years in photo-chemical research, is said to have invented an emulsion which will make colour photography possible for all, and also threaten the supremacy of the black and white film of the cinema theatre. It is claimed that all the difficulties of colour photography have been overcome. One of the chief problems was to make the process capable of snapshot as well as "time" work. This, however, has been solved, and the exposure can be as rapid as with the ordinary emulsion, thus fitting the invention for cinema work.

GLASS MANUFACTURERS IN CANADA have been largely dependent in the past upon the United States for their supplies of glass sand and sodium carbonate. Now, according to the United States Bureau of Mines Report, the new plant at Amherstburg, Ontario, Canada, at which sodium carbonate is to be made by the Solvay process, is expected to supply all of Canada's needs for soda ash. The capacity of this plant is reported to be about 120 tons per day. Some glass sand is being secured from Oneida, Ontario, but it is said to be of an inferior grade and only suitable for the manufacture of the cheaper grades of glassware.

MR. J. ABADY, Chairman of the Westminster Profiteering Committee, speaking at a sitting in the City Hall, on Friday, October 31, said that it was a public scandal that the soap supplies were being held up. The price before the war was 25s. 3d. per cwt., and it had advanced to 80s. 3d. per cwt. That meant that for 28 lb. one had now to pay 24s. 6d., which only allowed the tradesman a profit of 4s. 5d. "We think the traders' profit reasonable," he continued, "but we propose to draw the attention of the Board of Trade to the increased wholesale prices, which seem to be unjustifiable, particularly when it is notorious that facilities for manufacturing the raw materials from which soap is made were greatly increased by factories which made the same materials being erected for war purposes."

AT THE QUARTERLY MEETING of the Association of British Chambers of Commerce, held last week in London, the Dewsbury Chamber submitted a motion demanding the immediate removal of all restrictions on the importation of dye-stuffs, to which Mr. Sutcliffe Smith (Bradford) moved the following amendment: "That the late war having clearly demonstrated the necessity for the establishment of the dyemaking industry in this country, this association approves of the efforts of the Government to make the country self-supporting in the production of dyes; but, pending that time, urges that licences be granted without delay for the import of such dyes as are essential to the maintenance of our trade." Mr. Hobson thought they ought not to arrive at a decision which would bind the association, and Sir Algernon Firth suggested that the matter should be referred to the next quarterly meeting. It was decided to adjourn the subject till the next meeting.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used will be published at suitable intervals.

British

AMMUNITION. Recovery of nitre and pitch from "smoke candles." E. R. Thomas. *J. Soc. Chem. Ind.*, October 31, 388R. Note on the method employed to utilise these "candles," formerly destroyed.

CELLULOSE ACETATE. Cellulose acetate. E. C. Worden. *J. Soc. Chem. Ind.*, October 31, 370-374T. A useful review of the manufacture, particularly by the Dreyfus process.

COAL. Coal and its conservation. W. A. Bone. *J. Roy. Soc. Arts*, October 31, 765-772. Cantor Lecture III. This lecture deals with coal conservation and electric power supply. (See also CHEM. AGE, 527, 553.)

Coal conservation as aided by the gas industry. D. Clark. *Gas World*, November 1, 16-17. Address to British Commercial Gas Association on October 28.

COPPER. Notes on the wet extraction of copper. D. W. Jones. *J. Soc. Chem. Ind.*, October 31, 365-367T. An account of the various steps of the process, and of the recovery of by-products.

COMBUSTION. The ignition of gases by hot wires. W. M. Thornton. *Phil. Mag.*, November, 613-633. An important experimental study of the subject.

FUEL. Fuel economy. *J. Soc. Chem. Ind.*, October 31, 387-388R. Leading article.

GAS. Water gas and coal conservation. S. Moore. *Gas World*, November 1, 344-345. Paper read before Eastern Counties Gas Managers' Association on October 18, describing the plant at Scunthorpe and its operation.

Complete gas analysis. E. W. Smith. *Gas World*, November 1, 342-343. Some modifications of methods and apparatus used at the Birmingham Gas Works are described.

Improved methods for the analysis of gas. W. Buckley and F. S. Sinnatt. *Gas J.*, November 4, 250-254. Paper read before the Manchester District Institution of Gas Engineers on October 31.

GLASS. Glass manufacture at the end of the war. M. W. Travers. *J. Soc. Chem. Ind.*, October 31, 388-391R. An address to the British Association, Section B.

NITROUS GASES. Method for the analysis of nitrous gases and its application to the study of towers for the absorption of such gases. A. Geake and P. W. Squire. *J. Soc. Chem. Ind.*, October 31, 367-369T.

PLANT. The coal distillation plant, electric power station, and calcium carbide works to be erected by the South African Carbide and By-Products Co., Ltd. *South Afr. Eng.*, October 31, 185-186. The plant to be erected near the Ballengeich Colliery is described.

SULPHURIC ACID. Some observations on sulphuric acid plants, new and old. XIII. *Gas World (Coking Sect.)*, November 1, 16-17. Experiences with the Ramen-Beskow mechanical chlorinating roasting furnace are recounted.

THIOCARBONATE. Estimation of cyanogen compounds in concentrated ammonia liquor. Part II. Estimation of thiocarbonate. P. E. Spielmann and H. Wood. *J. Soc. Chem. Ind.*, October 31, 369-370T.

Colonial

FIBRES. An investigation of the marine fibre of *Posidonia Australis*. J. Read and H. G. Smith. *Bull.*, 14, Institute of Science and Industry, Commonwealth of Australia, 42 pages and 20 plates. A valuable monograph, describing the chemical and physical characteristics of the fibre, and suggesting possible industrial application.

French

BENZOL. The manufacture of benzol. C. Berthelot. *Chim. et Ind.*, September, 1017-1023. An illustrated account of the methods used and progress made.

Continuous rectification of benzol. A. Baril. *Chim. et Ind.*, September, 1013-1016. The plant used and results obtained at Gennevilliers are described.

DISTILLATION. Continuous distillation. P. Mallet. *Chim. et Ind.*, September, 1005-1007. Useful notes, with special reference to the distillation of tar and mineral oils.

HYDROCARBONS. Hydrocarbons during the war. L. Paillard. *Chim. et Ind.*, September, 1008-1012. Notes on the fractional distillation of benzene, chlorobenzene, motor spirit, etc., in apparatus of the Barbet type.

IODINE. Progress in the iodine industry in France, and the future of the industry. P. Gloess. *Monit. Scient.*, October, 193-194.

TANNINS. Synthetic tanning agents and their use in the tannery. E. Nihoul. *Chim. et Ind.*, September, 1024-1034. A useful review of the subject.

German

ANALYSIS. Report on the progress of the analysis of metals in 1917-1918. T. Döring. *Chem. Zeit.*, October 9, 682-684. The analysis of nickel, cobalt, and platinum is reviewed. (See also CHEMICAL AGE, 553.)

FOODS. Quantitative micro-analysis of foods and feeding stuffs. W. Herter. *Z. Unters. Nahr. Genussm.*, August 15, 65-89. A useful account of methods employed.

FUEL. Solid fuels in 1917-1918. W. Bertelsmann. *Chem. Zeit.*, October 11, 690-691. Review of the literature on combustion and analysis. (See also CHEMICAL AGE, p. 553.)

FURNACES. Improvement of the heat efficiency in furnaces, especially Martin furnaces. W. Tafel. *Stahl u. Eisen.*, October 23, 1280-1283. Methods of effecting economy, including waste heat recovery, are suggested.

Miscellaneous

GAS. Studies in gas production. B. Wigersma. *Chem. Weekblad*, October 25, 1356-1370. A number of tests with the Dellwik producer are recorded.

Paint Grinding

MR. W. H. BARNES (Messrs. Follows & Bate, Ltd.), lectured on Tuesday at the Manchester Municipal College of Technology on "Paint Grinding." As his object was to make clear the different mechanical operations embodied in paint grinding, he did not enter into the history of paint or the consideration of the various recipes in use by paint manufacturers, but explained the different processes, and dealt with such points as he thought might be of advantage to the chemical engineer. His address was therefore for the most part a description of and commentary upon the machines used in paint-grinding which were shown upon the screen in lantern views. He devoted a good deal of attention to the iron edge runner mill and the percussion mill employed in grinding, and to the minutiæ of the whole process.

Dr. Maxted's Articles

WE regret that owing to the pressure upon our space we are obliged to hold over the final instalment of Dr. Maxted's article on "The Synthesis of Ammonia" until next week.

THE MEMBERS OF Newcastle-on-Tyne Chemical Club held a successful whist drive on Friday, October 31, in their rooms at the Drawing Room Cafe. Mr. H. Dunford Smith, Secretary of the Newcastle Section of the Society of Chemical Industry, won the first prize.

Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

123,527. Coke Ovens. Société Ch. M. Stein et Cie., 5, Rue d'Edimbourg, Paris. International Convention date (France), February 22, 1918.

A series of distillation chambers are arranged side by side, and a series of combustion chambers are arranged one between each pair of distillation chambers. Each distillation chamber is superposed over a heat recuperator, and the fuel gas and air are preheated in alternate recuperators. The air or gas flows vertically upward through the recuperator, and the combustion gases are passed through horizontal passages in the recuperator. The fuel gas may be supplied direct to the combustion chambers when required, and each recuperator may be connected to two combustion chambers.

133,059. Hydrocarbons, Treatment of. G. F. Forwood, Mark Lane Station Buildings, London, E.C. 3, and J. G. Taplay, 45, Sternhold Avenue, Streatham Hill, London, S.W. 2. Application dates, December 12 and 22, 1916.

Hydrocarbon oils, such as coal or shale oil, petroleum, or lignite oil, are vaporised and mixed with steam, and the mixture passed over carbon heated to 450° to 600° C., the temperature depending on the oil under treatment. The carbon used must be in such a physical condition that it is capable of decomposing steam at about 500° C., and it must have been prepared at a temperature approximately equal to, or not greatly exceeding, the temperature at which the oil is treated. The invention consists primarily in the selection of a carbon having these properties, *e.g.*, lamp black, soot, or wood, cellulose, and lignite charcoal. The oil vapour may or may not be cracked during the operation, and it is found that sulphur is mainly eliminated as sulphuretted hydrogen. Oils of high boiling point are converted into low-boiling oils, and unsaturated hydrocarbons are converted into other compounds.

133,075. Oils, Fats, and other Greases, Method of Extracting—from Garbage, House Offals, and other Refuse containing also Water. F. B. Dehn, London. (*From Cobwell Corporation, 1,429, Williamson Building, Cleveland, Ohio, U.S.A.*) Application date, August 3, 1917.

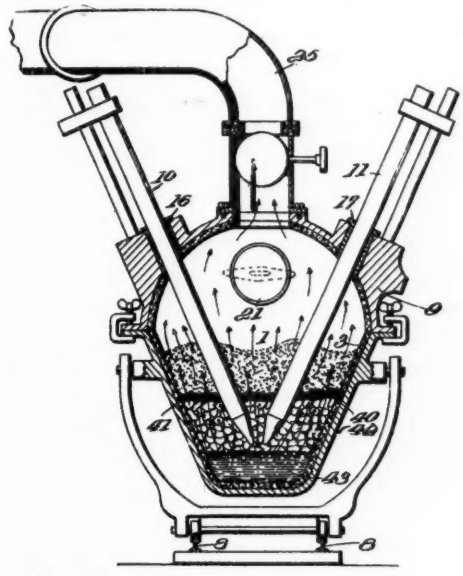
The material is mixed with a grease solvent which is insoluble in water, such as naphtha, or certain chlorinated derivatives of hydrocarbons, such as carbon tetrachloride. The mixture is then raised to a temperature such that the combined vapour pressure of the solvent and water is equal to that in the containing vessel. Water and solvent vapour are thereby drawn off at a comparatively low temperature, and solvent is continuously added to maintain a substantially constant amount. After the water is all expelled the solvent and dissolved oil are drawn off, and the residual material is then treated with a solvent of low boiling point, so that less heat is required for the subsequent fractional distillation. A suitable plant for carrying out this process is described in detail.

133,095. Cyanogen Compounds, Process of Producing Substantially Pure. The Nitrogen Corporation, Assignees of J. C. Clancy, both of 55, Canal Street, Providence, R.I., U.S.A. International Convention date (U.S.A.), June 12, 1917.

In the known method of producing cyanide by mixing sodium carbonate, ground coke or charcoal, and a catalyst, such as finely divided iron, heating the mixture to a red heat, and passing nitrogen or producer gas over it, difficulty is experienced in recovering the cyanide. On treatment of the residue with water, sodium carbonate is also dissolved and the catalyst attacked. The invention consists in extracting the alkali cyanide with liquid ammonia, in which the impurities are practically insoluble and which has no action on the catalyst. The undissolved residue may therefore be used for further treatment with nitrogen to convert the remaining sodium carbonate. The mixture to be treated with nitrogen is preferably briquetted before such treatment, and the briquette structure is not destroyed by the subsequent treatment with liquid ammonia.

133,098 and 133,100. Carbide, Process of Producing. J. H. Reid, 4,116, Jenkins Arcade Building, Pittsburgh, Pa., U.S.A. Application date, March 13, 1918.

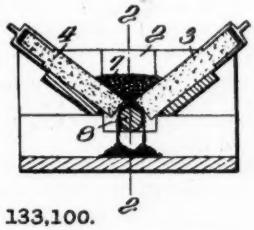
133,098. An electric furnace 1 is provided with a lining 3, and is supported by trunnions journalled in a carriage which runs on rollers 8. Electrodes 10, 11, pass through the cover 9, provided with insulation sleeves 16, 17. A mixture of coking coal and lime is introduced through the opening 21, about 5 per cent. of powdered coke being also added to reduce the initial electrical resist-



133,098.

ance. An electric current is then passed through the mixture, and volatile products pass off through the conduit 25 to a gas main and condenser. After all the volatile matter is expelled, the residue 42 is strongly heated by the current. The loose material 40 at the top is acted upon by the hot gas to effect the preliminary coking, tar collects in a layer at 41, and the carbide produced settles to the bottom at 43. As the level of the carbide rises, the electrodes are raised to avoid the passage of current through the carbide.

133,100 The process is similar to that described in the preceding abstract, and means are provided to remove the carbide from the heating zone as rapidly as it is formed. Electrodes 3, 4, project



133,100.

into the receptacle 2 containing the lime-carbon-coke mixture 7, and the material is heated by resistance, the hearth 8 acting to concentrate the heat. The molten carbide is discharged as rapidly

as it is formed through the openings between the electrodes and the hearth 8, and collects on the floor, from which it is removed periodically. The granular lime-carbon-coke is prevented from passing out of the furnace, while the removal of the carbide prevents its decomposition and contamination.

133,101-2-3. Calcium Carbide, Preparation of Crude Materials for Manufacture of. F. L. Slocum, 401, S. Linden Avenue, Pittsburgh, Pa., U.S.A. Application date, March 13, 1918.

133,101. In the manufacture of the lime-coke mixture by the Reid process (*see preceding abstracts*) air pores are produced in the material, and this invention aims at avoiding this defect. Hydrated lime is mixed with ground bituminous coal in the proper proportions and coked. Most of the volatile matter of the coal is expelled at 400° C., and the lime gives off water at 450° C. in the form of superheated steam. The amount of ammonia obtained from the fixed nitrogen of the coal is materially increased by the superheated steam. The product is a very finely powdered material. This material is mixed with about 2 to 4 per cent. of carbon pitch or other binder, heated, and then briquetted.

133,102. In the above process for making lime-coke for subsequent conversion into carbide the lime is mixed with moist carbonaceous matter, such as peat. The mixture is heated to about 450° C. to expel water and carbonise the peat, and the finely powdered residue is briquetted as before.

133,103. A nitrified material is treated with steam at such a temperature that ammonia is produced, and the residual carbonate is calcined until most of the carbon dioxide is driven off. The resulting mixture of oxide together with some carbon is mixed with the necessary additional carbon in the form of bituminous coal, and the mixture is coked and then briquetted as before.

133,104. Nitrogen, Fixation of. F. L. Slocum, 401, S. Linden Avenue, Pittsburgh, Pa., U.S.A. Application date, March 13, 1918.

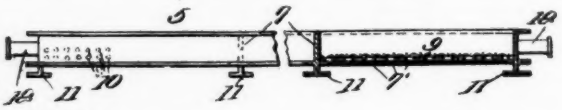
In the fixation of nitrogen by its action on a heated carbide, various catalysts are used. In one modification the catalyst consists of 2 to 5 per cent. of a compound formed by the action of nitrogen and a carbide. The nitrogen to be fixed contains also about 1 to 2 per cent. by volume of a gaseous catalyst, such as carbon tetrachloride or other carbon-haloid. The solid catalyst may alternatively consist of a partially nitrified material, or about 1 to 5 per cent. of an alkali metal salt or hydrate or oxide, or other compound having a strong affinity for chlorine may be used, with or without the other catalysts. The carbide to be treated may be treated with the carbon-haloid prior to its treatment with nitrogen, or the carbon-haloid may be added to the nitrogen as vapour, but in all modifications the carbon-haloid is present as a catalyst.

133,105. Cyanogen Compounds and Ammonia, Production of. F. L. Slocum, 401, S. Linden Avenue, Pittsburgh, Pa., U.S.A. Application date, March 13, 1918.

The furnace used is of the regenerator type, and the carbide is contained in tiers of shallow trays supported in a framework which is adapted to be moved into and out of the heating chamber on rollers. Each tray has a perforated bottom and sloping sides, and the bottom is covered by a wire screen. The heating chamber containing the carbide is filled with nitrogen, and heated to about 1,000° C. until nitrogen ceases to be absorbed. The chamber is then allowed to cool to about 450° C., and steam is passed through it to convert the combined nitrogen into ammonia. The charge may then be removed and the process repeated with a fresh charge, or the heat may first be raised to about 850° C. to remove water and expel carbon dioxide from any calcium carbonate previously formed. All the steps in the process may thus be carried out in a single apparatus. The carbide may be mixed with a catalyst or may be treated with nitrogen containing a catalytic vapour or gas.

133,106. Treating Material with Gas or Vapour, Apparatus for. C. C. Stutz, Engineers' Club, New York. Application date, March 13, 1918.

Relates to the treatment of solid materials with gases or vapours, more particularly the treatment of carbides with nitrogen. The material is contained in open-topped trays arranged in a tier in the heating chamber. Each tray 5 is of oblong form adapted to fit the heating chamber, and may be divided transversely by partitions 7. The bottom of the tray is perforated as shown at 7^1, and the perforations are covered by layers of gauze or meshed fabric 9. The side and end walls may also be perforated as at 10. The trays may be provided with supports 11, so that when stacked one above



133,106.

the other space is left for the circulation of the gas. Projections 12 may be provided for convenience in handling and arranging the trays.

133,159. Destructive Distillation of Organic Materials, Recovery of Gaseous Products from Plants for. E. Bury, O. Ollander, and A. F. Bury, Skinningrove Iron Co., Ltd.'s, Works, Saltburn-by-the-Sea, Yorks. Application date, October 4, 1918.

To separate the gaseous products of the destructive distillation of materials such as coal, shale, peat, oils, and ligneous substances an occluding agent is used, and it is found that peat-coke is an efficient and cheap substitute for wood charcoal. Air-dried peat is distilled in a carbonising plant at 700° to 900° C., and the gases are treated for the recovery of ammonia, &c. The residue is a soft coke suitable for the absorption of such gases and vapours as ethylene, benzene, propylene, toluene, xylene, sulphuretted hydrogen, carbon bisulphide, and organic sulphur compounds. The absorbed material may be recovered by distillation.

133,217. Liquids with Gases, Apparatus for use in the Treatment of. H. J. Magrath, 10, Berkley Street, London, E.C. 1. Application date, December 6, 1918.

In apparatus for treating liquids with gases which are contained under pressure in cylinders means are provided for connecting automatically a fresh cylinder to the apparatus when the previous cylinder is nearly exhausted. The gas pressure acts on a diaphragm, which is pressed in the opposite direction by a spring, so that when the pressure falls below a pre-determined amount a relay device is operated, and a weight-operated mechanism is brought into action to change the gas connections. One valve may be closed and the other opened by clockwork.

133,255. Gas Producers. F. Clements and W. S. Allen, Park Gate Works, Rotherham. Application date, March 25, 1919.

A poking hole in the top of a producer is provided with a spherical valve, and with a perforated steam pipe just above the valve seating. As the valve is opened, steam is supplied to the pipe, and is injected through the opening into the producer to prevent the escape of gas.

133,277. Mineral Selective Agent and Methods of Producing and Using same. E. C. R. Marks, London (*From Luckenbach Processes Incorporated, 57, Post Street, San Francisco, Cal., U.S.A.*). Application date, November 4, 1918.

In the separation of the mineral from ores of gold, silver, copper, lead, zinc, nickel, &c., a solution of indiarubber is used as the mineral selective agent. The indiarubber is preferably dissolved in a hydrocarbon or other solvent, such as "near-turpentine." A frothing agent, such as a solution of greasewood, may also be used, with or without another mineral selective agent, such as petroleum.

Note.—Complete specifications 128,180 (kilns) and 129,624 (separation of thorium compounds), which are now accepted and published, were abstracted when they originally became open to public inspection under the International Convention. (See The Chemical Age of August 16 and September 27.)

International Specifications Open to Inspection

131,870. Ammonium Chloride; Sodium Bicarbonate. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, 48, Rue St. Lazare, Paris. International Convention date, August 24, 1918.

The invention is a modification of 130,365 (see The Chemical Age of September 6). The mother liquor, after separating out the sodium bicarbonate, is mixed with sodium chloride, and ammonia gas and carbon dioxide are passed through it. The solution is

cooled to precipitate ammonium chloride, and is then treated with a further quantity of sodium chloride and carbon dioxide to precipitate sodium bicarbonate. The cooling of the solution may be effected by evaporating liquid ammonia, or liquid or solid carbon dioxide used in the process. The mother liquor is then treated over again to produce ammonium chloride and sodium bicarbonate.

131,881. Soaps; Fatty Acids. J. Morel, 1, Rue Molière, Grenoble, Isere, France. International Convention date, August 28, 1918.

The sodium carbonate used in the manufacture of soap from fatty acids may be replaced by waste sodium sulphite obtained in the manufacture of dyes. Sulphur dioxide is evolved, and may be used for decomposing calcareous soaps or treating waste soapy waters.

131,897-8. Molybdenum. Deutsche Molybdaen-werke Ges., Teutschenthal, near Halle, Germany. International Convention dates, May 23, 1916, and October 2, 1916.

131,897. Ore or slag containing molybdenum is treated with an alkali sulphide, polysulphide, or hydrosulphide. The resulting sulphomolybdate is treated with fresh yellow lead ore or with precipitated ferric hydroxide, manganese protoxide, or other oxygenated compound of lead, iron, manganese, or zinc. The sulphomolybdate is thus converted into molybdate.

131,898. The above process is modified by the use of a smaller quantity of sulphide than that theoretically necessary in the first stage of the process. The sulphomolybdate formed reacts with the excess of ore and forms the molybdate. The reaction may be carried out in solution, or with fused materials and subsequent extraction. Alternatively, yellow lead ore may be melted with an excess of alkali sulphide, and then leached and treated with a fresh quantity of the ore. The alkali sulphide may be replaced by ammonium sulphide.

Latest Notifications.

134,197. Alkaloids, Manufacture of. Chemische Fabrik vorm. Sandoz. October 23, 1918.

134,207. Crystallisation, Effecting from solution. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. October 23, 1918.

134,214. Sodium sulphate, Process of making. Salzwerk Heilbrown. January 24, 1918.

134,228. Filters, Method of making. E. De Haen, Chemische Fabrik List. December 4, 1917.

134,229. Nitric acid, Process and devices for effecting the synthesis of. L. A. Mage. October 24, 1918.

Specifications Accepted, with Date of Application

119,874. Combustible Gases from Carbonaceous Material, Process and Apparatus for Making. C. S. Palmer. October 5, 1917.

120,045. Hydrogen Peroxide, Process for the Synthetic Production of—and Apparatus therefor. R. Moritz. May 15, 1917.

121,455. Carbazole, Process for the Production of High-percentage. Soc. d'Eclairage, Chauffage, et Force Motrice December 4, 1917.

133,336. Titanium Compounds, Preparation of. H. Wrigley, H. Spence, and P. Spence & Sons. October 16, 1917.

133,353. Cellulose Acetate, Manufacture of Compositions, Preparations, or Articles having a basis of. H. Dreyfus. April 29, 1918.

133,354-5. Calcium Carbide, Manufacture of. F. M. Becket. April 30, 1918.

133,367. Lead Sulphate, Production of Basic. S. B. Wilson and Purex, Ltd. July 4, 1918.

133,374. Glycerol, Manufacture of. J. R. Eoff. July 21, 1917.

133,434. Liquid Fuel for Internal-combustion Engines, and Process for Preparing the same. A. de F. Lopez. October 8, 1918.

133,448. Centrifugal Separation. W. Mauss. October 10, 1918.

133,452. Bituminous Shales, Cannel Coals, and the like, Process of Utilising Residues from. Broxburn Oil Co. and R. H. Findlater. October 11, 1918.

133,474. Potassium Fluoride, Process for the Manufacture and Production of from Silicate Rocks. E. E. Dutt and P. C. Dutt. October 18, 1918.

133,485. Electric Furnaces. H. A. Kent. October 28, 1918.

133,497. Liquid Filtering Devices. E. C. Proctor. November 4, 1918.

133,498. Mineral Selective and Frothing Agent, and Processes or Methods of Producing and Using the same. E. C. R. Marks. (*Luckenbach Processes Inc.*) November 4, 1918.

133,554. Low Temperature Carbonisation, System of. J. A. Yeadon and T. Whitaker. January 4, 1919.

Patents Court Cases.

It is officially announced that licences have been granted to Messrs. Humphreys & Glasgow, Ltd., under the Trading with the Enemy Amendment Acts, 1916 and 1918, in respect of the following patents, viz.:—21,479/1908 (Dellwik-Fleischer Wassergas Ges.), 17,591/1909 (H. Lane), and 12,242/1912, 12,243/1912, 17,690/1913, 17,691/1913, 17,692/1913, 18,028/1913, 18,942/1913 (A. Messerschmitt). All these relate to the production of hydrogen gas

A licence has also been granted to Dwight & Lloyd Metallurgical Co. in respect of Patent 26,277/1905 (F. Heberlein), relating to roasting and sintering ores.

Official announcement is made of a petition by Messrs. W. and H. M. Goulding, Ltd., Dublin, and G. H. Allibon, Belfast, for an extension of the term of Patent No. 11,215, May 14, 1906, granted to G. H. Allibon, for "Manufacture of artificial manures and such like" (Superphosphates). Any notice of opposition must be given before December 15.

Chemical Matters in Parliament

Export of Oil Products

In reply to Colonel Wedgwood (House of Commons, October 30), who asked whether the Indian Government had been approached by any other Departments with a request that the export of oil products of a kindred nature with those of Africa should be prohibited except to British manufacturers, and if any reply had yet been sent to the Department concerned, Mr. Montagu stated the Government of India have considered a suggestion that they should regulate the export of copra and cocoanut oil on the lines of the scheme proposed in the case of similar West African produce, and have replied that they consider the proposed action unnecessary.

Quality of English Dyes

In reply to Major M'Kenzie (House of Commons, November 3), who asked if he were aware that the subsidized dye manufacturers were supplying to woollen manufacturers dyes which were not fast to milling; whether, in consequence, large quantities of good material were being spoiled weekly; and whether he would take steps to enable woollen manufacturers to obtain dyes which could be guaranteed, Sir A. Geddes said he had no information of the kind suggested; if there were any concrete evidence on the subject, he would be glad to receive it.

Cement for Housing

Captain R. Terrell asked the President of the Board of Trade (House of Commons, November 3), if he were aware that the short supply of cement in this country was hampering building operations in the home counties, that quantities were being sent abroad, presumably at a higher price, and whether the Government would take steps to secure that an adequate amount of cement was available for home needs before overseas demands were supplied?

Mr. Kellaway: There are considerable stocks of cement in manufacturers' works, but delivery of orders is being seriously delayed by lack of railway transport facilities. I am advised that it is this lack of transport and not the export trade which is prejudicially affecting building operations in certain parts of the country.

Price of Tinplates

In reply to Lieut.-Commander Chilcott (House of Commons, Nov. 4), Mr. Bridgeman stated that the maximum price of tinplates when control ceased was 33s. 10½d. per box of 112 sheets (108 lb.), f.o.t., at makers' works, and that the corresponding price at the present time is 41s. The desirability of instituting an inquiry into the price of tinplates was under consideration.

Morphia Exports to Japan

Mr. Bridgeman, in reply to Sir J. Agg-Gardner (House of Commons, November 4), stated that under an arrangement made in 1917 a licence for the exportation of morphia from Great Britain to Japan or to the Kwangtung leased territory, whether by parcel post or otherwise, was granted only on the production of a certificate from the competent Japanese authorities to the effect that the parcel in question would be used for medical purposes only. No licences for exportation to the Kwangtung leased territory had been issued under this arrangement. The total quantity of morphia licensed for export to Japan in 1918 was 36,489 ozs., and during the first eight months of the present year 5,026 ozs. It was not possible to state how much of the quantity licensed was actually exported during the last two years, as no figures were available with regard to the quantity of morphia exported by post.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, November 6, 1919.

THE market remains active, but the home trade demand is not quite so brisk. There is nothing to grumble about, however, makers being very well sold ahead. Values continue firm with little change.

The export position remains satisfactory and good business continues to be reported. There is a very active enquiry.

General Chemicals

ACID ACETIC is inclined to be a shade easier owing to more supplies being available.

ACID CARBOLIC.—Trade is still active in this material at recent prices.

ACID OXALIC.—Price is maintained for the English make, and foreign supplies are scarcer, and the price is hardening for the Continental make.

AMMONIUM SALTS are in good request and moving off steadily.

ARSENIC is firm and supplies scarce.

BARIUM SALTS.—Only a moderate trade is passing, and chloride is again easier.

BLEACHING POWDER is in moderate demand only.

COPPER SULPHATE remains inactive, with little trade to report.

FORMALDEHYDE is again higher in price, and supplies are very difficult to obtain.

IRON SULPHATE (Green Copperas) is in fair request and easy to obtain.

LEAD SALTS are without change, with a moderate demand for nitrate.

MAGNESIUM SALTS are all active, trade being especially good in sulphate.

POTASSIUM BICHROMATE is in fair demand, especially on export account.

POTASSIUM CARBONATE is firm, and supplies still light.

POTASSIUM NITRATE.—The price has been slightly raised, and business is brisk.

POTASSIUM PERMANGANATE is firmer.

POTASSIUM PRUSSIATE.—The English make is in better demand at recent prices.

SODIUM ACETATE is passing off much better, and price is unchanged.

SODIUM CAUSTIC continues in strong request, and price is slightly higher for re-sale parcels. Makers are well sold.

SODIUM NITRITE is firmer and comparatively scarce.

SODIUM PRUSSIATE is again higher, and there does not appear to be any relief in sight from the present scarcity.

Coal Tar Intermediates

Trade in this section continues very active, and for a number of products it is now becoming increasingly difficult to secure reasonably prompt delivery. A few good lines have also been placed for export.

ANILINE OIL is becoming somewhat scarce for near delivery, and price is firm.

ANILINE SALT is almost unobtainable for prompt delivery, and price is higher.

BETA NAPHTHOL.—Some good business has been placed for forward delivery, and price is inclined to be higher.

DIMETHYLANILINE.—Business is again reported in this product at last quoted figures.

PARANITRANILINE is inclined to be scarce, but price is nominally without change.

NAPHTHIONATE OF SODA is moving off very steadily at recent quotations.

Heavy Coal Tar Products

Prices for most coal tar products show a slight advance on last week.

BENZOL (90 per cent.).—2s. 1d. free on rails makers' works has been done, and forward business is also quoted at a similar figure.

CRESYLIC ACID remains active, and the price tends to stiffen. 2s. 6d. per gallon naked at the works for 97/99 per cent. might still be done, and for 95/97 per cent. quality 2s. 4d. per gallon on the same conditions.

CREOSOTE OIL is in very fair demand, and the price in the North is about 6½d. per gallon and in the South about 7⅜d. per gallon.

NAPHTHALENE.—Considerable forward business has been done in this article, and the price remains at £7 10s. per ton for crude and £20 per ton for the refined.

SOLVENT NAPHTHA is steady at 2s. 6d. free on rails makers' works in Midlands and 2s. 8d. in London. 1920 business.—There are various conflicting reports as to price, but 2s. 6d. per gallon at makers' works seems to be more or less the recognised price.

HEAVY NAPHTHA.—An increased inquiry is maintained, and the price in the Midlands is about 2s. 5d., with 2s. 7d. per gallon quoted in London.

PITCH.—The position remains unchanged.

Sulphate of Ammonia

There are no new features to report.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	9	to	0	3	0
Acetone, pure	ton	95	0	0	to	97	0	0
Acid, Acetic, glacial, 99-100%	ton	77	10	0	to	80	0	0
Acetic, 80% pure	ton	65	0	0	to	67	10	0
Carbolic, cryst. 39-40%	lb.	0	0	9	to	0	0	9½
Citric	lb.	0	4	4	to	0	4	5
Lactic, 50 vol.	ton	70	0	0	to	72	10	0
Lactic, 60 vol.	ton	85	0	0	to	87	10	0
Oxalic	lb.	0	1	1½	to	0	1	2
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Tannic, commercial	lb.	0	3	0	to	0	3	3
Tartaric	lb.	0	3	3	to	0	3	4
Alum, lump	ton	17	15	0	to	18	0	0
Aluminium, sulphate, 14-15%	ton	14	10	0	to	15	0	0
Aluminium, sulphate, 17-18%	ton	18	0	0	to	18	10	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	32	10	0	to	37	10	0
Ammonia, carbonate	lb.	0	0	6½	to		—	
Ammonia, muriate (galvanisers)	ton	44	0	0	to	45	0	0
Ammonia, nitrate	ton	45	0	0	to	50	0	0
Ammonia, phosphate	ton	115	0	0	to	120	0	0
Arsenic, white, powdered	ton	60	0	0	to	62	0	0
Barium, carbonate, 92-94%	ton	13	0	0	to	14	0	0
Chloride	ton	21	10	0	to	22	10	0
Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	16	10	0	to	17	0	0
Borax crystals	ton	39	0	0	to	40	0	0
Calcium acetate, grey	ton	23	0	0	to	25	0	0
Chloride	ton	8	10	0	to	9	0	0

	per	£	s.	d.		£	s.	d.
Casein, technical	ton	80	0	0	to	83	0	0
Cobalt oxide, black	lb.	0	7	9	to	0	8	0
Copper sulphate	ton	40	0	0	to	41	0	0
Cream Tartar, 98-100%	ton	245	0	0	to	250	0	0
Epsom salts (see Magnesium sulphate)								
Formaldehyde 40% vol	ton	160	0	0	to	165	0	0
Iron perchloride	ton	32	0	0	to	34	0	0
Iron sulphate (Copperas)	ton	4	10	0	to	4	15	0
Lead acetate, white	ton	83	0	0	to	85	0	0
Carbonate (White Lead)	ton	51	0	0	to	55	0	0
Nitrate	ton	59	0	0	to	61	0	0
Lithophone, 30%	ton	44	0	0	to	46	0	0
Magnesium chloride	ton	15	0	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	11	0	0	to	11	10	0
Sulphate (Druggists')	ton	17	10	0	to	18	0	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	0	11	6	to	0	12	0
Potassium bichromate	lb.	0	1	6	to	0	1	7
Carbonate, 90%	ton	102	0	0	to	105	0	0
Potassium Chlorate	lb.	0	1	2	to	0	1	3
Meta-bisulphate, 50-52%	ton	235	0	0	to	245	0	0
Nitrate, refined	ton	59	0	0	to	61	0	0
Permanganate	lb.	0	3	3	to	0	3	6
Prussiate, red	lb.	0	6	0	to	0	6	3
Prussiate, yellow	lb.	0	1	10	to	0	2	0
Sulphate 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	4	0	0	to		—	
Seconds	cwt.	3	15	0	to		—	
Sodium acetate	ton	48	0	0	to	50	0	0
Arsenate, 45%	ton	50	0	0	to	52	0	0
Bicarbonate	ton	9	0	0	to	9	10	0
Bisulphate, 60-62%	ton	32	10	0	to	33	10	0
Chlorate	lb.	0	0	6½	to	0	0	7
Caustic, 70 %	ton	25	0	0	to	26	0	0
Caustic, 76 %	ton	25	10	0	to	26	10	0
Hyposulphite, commercial	ton	19	10	0	to	20	0	0
Nitrite, 96-98%	ton	60	0	0	to	61	0	0
Phosphate, crystal	ton	28	0	0	to	30	0	0
Prussiate	lb.	0	1	0½	to	0	1	1
Sulphide, crystals	ton	16	0	0	to	16	10	0
Sulphide, solid, 60-62%	ton	22	10	0	to	23	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
,, Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	38	0	0	to	40	0	0
Tin perchloride, 33%	lb.	0	2	4	to	0	2	5
,, Protochloride (tin crystals)	lb.	0	1	9	to	0	1	10
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	50	0	0	to	52	10	0
Sulphate	ton	21	10	0	to	23	0	0
Oxide, Redseal	ton	75	0	0	to	80	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	0	to	0	3	6
Alphanaphthol, refined	lb.	0	3	6	to	0	3	9
Alphanaphthylamine	lb.	0	2	8	to	0	2	9
Aniline oil, drums free	lb.	0	1	2	to	0	1	3
Aniline salts	lb.	0	1	8	to	0	1	9
Anthracene, 85-90%	lb.	0	1	5	to	0	1	6
Benzaldehyde (free of chlorine)	lb.	0	6	6	to	0	7	0
Benzidine, base	lb.	0	6	6	to	0	7	0
Benzidine, sulphate	lb.	0	5	6	to	0	6	0
Benzoic, acid	lb.	0	5	0	to	0	5	3
Benzoate of soda	lb.	0	5	0	to	0	5	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	2	8	to	0	2	9
Betanaphthylamine, technical	lb.	0	6	6	to	0	7	0
Croceine Acid, 100% basis	lb.	0	4	9	to	0	5	0
Dichlorbenzol	lb.	0	0	5	to	0	0	6
Diethylaniline	lb.	0	7	0	to	0	8	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	1	2	to	0	1	3
Dinitronaphthaline	lb.	0	1	6	to	0	1	9
Dinitrotoluol	lb.	0	1	3	to	0	1	6
Dinitrophenol	lb.	0	1	3	to	0	1	6
Dimethylaniline	lb.	0	3	0	to	0	3	3
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	11	6	to	0	12	0
Metaphenylenediamine	lb.	0	4	9	to	0	5	0
Monochlorbenzol	lb.	0	0	9	to	0	0	10
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2 :7)	lb.	0	7	0	to	0	8	0
Naphthionic acid, crude	lb.	0	3	3	to	0	3	6
Naphthionate of Soda	lb.	0	4	0	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	6	to	0	5	0
Nitronaphthaline	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	3
Orthotoluidine	lb.	0	2	2	to	0	2	3
Orthonitrotoluol	lb.	0	1	6	to	0	1	9
Para-amidophenol, base	lb.	0	14	0	to	0	15	0
Para-amidophenol, hydrochlor	lb.	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	4	to	0	0	5
Paranitraniline	lb.	0	3	9	to	0	4	0
Paranitrophenol	lb.	0	1	10	to	0	2	0
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	0	to	0	14	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	9	0	to	0	10	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	0	to	0	12	0
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salicylic acid	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	9	to	0	5	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	9
Sulphanilic acid, crude	lb.	0	1	3	to	0	1	6
Tolidine, base	lb.	0	9	0	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Chemical Sundries Business: Landlord's Unsuccessful Claim for Possession

In the Bow County Court, on Thursday, October 30, before Judge Graham, K.C., Morris Hanbury, 329, Dersingham Road, Manor Park, asked for the possession of premises, occupied by Mr. A. S. Herring, of 335, Dersingham Road, Manor Park, a wholesale dealer in chemicals and chemists' sundries. The premises were taken by the defendant eight years ago for 7s. 6d. a week, which was raised just before the war to 9s. 6d. a week. The plaintiff who had purchased the place was only asking for possession of the shop, but it was contended that the shop was let with the dwelling.

Mr. Warne, the agent, denied that the shop was let with the dwelling; together they would be worth 14s. a week. He agreed that the rent book did not say "excluding the shop," but that was purely a mistake.

Mr. Hanbury, the plaintiff, said that defendant first of all agreed to pay extra rent, but afterwards said the dispute would have to go to law.

Mr. A. S. Herring said he took the shop and dwelling, the shop being the principal thing, for the carrying on of his chemical and chemists' sundries business. It had greatly increased since his return from the war.

Judge Graham decided that the shop was let with the dwelling, and as under the Act possession of a part of a letting could not be asked for, there would be a verdict for the defendant, and costs.

The Affairs of J. A. Hanley

The first meeting of creditors of James Alec Hanley, 5, Woodsley Terrace, Leeds, agricultural chemist, was held on October 28, at the Official Receivers' Offices, Leeds. The statement of affairs showed liabilities amounting to £943 12s. 1d., with assets (consisting of furniture) estimated to produce £52. The debtor alleged as the cause of his failure debts contracted by his wife without his knowledge. The debtor is employed by a public authority as an agricultural chemist at a salary of £375 per annum. Previously he was engaged in chemical research work in London and Munich. He stated that he had known for twelve months that debts were owing, but he was assured by his wife that they would be paid out of a private income which she stated she possessed. He only discovered the true state of affairs on October 1. No resolutions were passed; the matter was left in the hands of the Official Receiver.

Seizure of Pyrogallic Acid

In the Chancery Division on Wednesday, October 29, a motion on behalf of the Crown to stay the action by Mr. John Brown, trading as Brown & Forth, chemical dealers and importers, of Farringdon Road, E.C., and Dolefield, Bridge Street, Manchester, came before Mr. Justice Sargant. The matter had been before the judge in the Vacation Court on a motion for an injunction by the plaintiff to restrain Mr. W. Buckley, customs and excise office at Manchester, from dealing with 5 tons of pyrogallic acid which he had seized under a Proclamation prohibiting the importation of certain goods under the section of the Customs Regulations Consolidation Act, 1876, dealing with "arms, ammunition, gunpowder, and other goods." After arguments by counsel it was agreed that an early day should be fixed for the trial of the action, subject to the convenience of the Attorney-General.

Affairs of Perry Mills & Co.

Examination of Debtors

At the London Bankruptcy Court, on Tuesday, before Mr. Registrar Mellor, Joseph Algernon Hare Duke and Henry Slater, who had carried on business as export merchants, chiefly interested in chemicals, under the style of Perry Mills & Co., 61 and 62, Gracechurch Street, E.C., came up for examination.

Their joint statement of affairs disclosed liabilities £30,919 17s. 4d., of which £11,103 0s. 3d. were returned as wholly unsecured; £6,698 18s. 5d. as fully secured; £12,922 18s. 8d. as partly secured (the securities being valued at £9,886); and £195 as preferential; making a total ranking indebtedness of £14,139 18s. 11d. The assets, which were estimated to realise a net amount of £3,137 7s. 10d. after payment of the preferential claims, consisted of cash £215 12s., stock-in-trade £610, good book debts £2,060 14s. 3d., bad book debts £235 13s. 7d., and doubtful book debts £14,393 15s. 3d., to which no value was attached, and another item of £250.

Mr. Duke's Evidence

Examined by the Official Receiver, Duke said that from 1896 until 1908 he was a clerk on half commission terms on the Stock Exchange. In the latter year he borrowed £2,000 from a cousin to take up shares in a margarine company which he had formed. He acted as a director of that company at £350 per annum, but two years afterwards it went into compulsory liquidation and he lost his £2,000 together with another £300 which he had guaranteed to the company's bankers. He did not return his cousin as a creditor, although the £2,000 which he had borrowed from him had never been repaid. In June, 1912, as one of a promoting syndicate, he formed Oil Refineries, Ltd., which was a margarine manufacturing concern, carrying on business at Hammersmith. As a director and acting manager he received £700 a year, and he put into the company £300 which he had saved. The company was a prosperous undertaking and he always received dividends until he disposed of his shares. The company was still paying dividends. He ceased to be a director on July 31 last.

Selling Agents for German Firms

After the company had been promoted he entered into partnership with R. Dawson Petty and they adopted the trading style of Perry Mills & Co., and carried on business as general agents in Gracechurch Street, E.C. Although the partners must have possessed capital at that time, neither of them put any into the business. They soon became selling agents for German manufacturers. In 1913 they also became buying agents. They bought certain goods for the Oil Refineries, Ltd., on whose behalf they acted. But generally speaking they were selling and not buying agents for foreign firms, although at the date of the Armistice they were acting in the capacity of selling agents for firms in Italy. Balance sheets and profit and loss accounts were prepared only for the periods January 1 to May 31, 1916, and August 31, 1916, to June 30, 1917.

Asked why they were not regularly prepared, the debtor replied that they were for a time after Petty went, but afterwards the firm was unable to obtain the services of an accountant. For the five months in 1916 the profit amounted to £1,726, whilst the accounts for the second period showed a profit of £1,241. On June 30, 1917, they estimated there was a surplus of £2,043. On November 19, 1917, the partnership with Petty was dissolved by mutual consent, the business then being solvent. Petty took over the wharf at Fulham, whilst witness took over the remainder of the business. He was then joined by Slater, who had acted as manager of the business for two years and three months and paid £700 for a one-half share in the business. In March, 1918, the debtor joined the Ministry of Food, being engaged in research work, and in connection with methods of preserving foodstuffs, and received a salary of £300. That appointment he held until March last. In August of last year the firm opened a branch office at 67, Hanging Ditch, Manchester. Slater was of opinion that the firm might be able to buy chemicals cheaper in Manchester than in London, but that undertaking resulted in serious loss. That business was principally directed towards the export of chemicals to the Continent. As a rule they only bought against orders already obtained.

Effects of the Armistice

The trading was profitable until the signing of the Armistice, although there were no accounts to show that at that date they had shipped to three firms in Italy goods to the value of £13,654 previously ordered. They obtained advances up to £6,400 on the bills of lading from the Banca Commerciale Italiano and paid the balance with the aid of their own moneys; but in January last they heard from their bankers that the bills had not been taken up by the Italian firms and on cabling to Italy they received the reply that the Armistice had cancelled the contracts. The real reason for the rejection of the goods might have been that the market had fallen. The bank were now secured creditors for £1,630, being the difference between the amount of their advances and their security, which they valued at £4,770. They had realised a portion of the goods and negotiations were pending for a settlement with regard to the remainder.

The claim of the petitioning creditors Nippon Stoke Co., Ltd., was in respect of breach of contract for not taking up 50 tons of Japanese farina ordered in October, 1918, for supply to a Marseilles firm which did not carry out their contract. His firm had bought at £118 and the farina was sold at £29 10s. a ton against them, with the result that the petitioners obtained judgment against them for £4,600 in May. It was in consequence of those proceedings that witness suddenly severed his connection with Oil Refineries, Ltd. He attributed the failure to the default of Italian customers to take up deliveries and to the heavy fall in prices following the signing of the Armistice.

The Official Receiver put it to the debtor that the firm made a profit in 1917 of £12,000, whereas the deficiency account showed none. The debtor undertook to attend upon the Official Receiver and go through various proofs of debt received, which claims had been omitted from the statement of affairs on the ground that in his opinion they were "unjust and immoral." If necessary he promised to insert them.

The debtor Slater confirmed the evidence given by his partner and the examination was then adjourned until December 9.

Chemical Prescriptions within the Profiteering Act?

In the King's Bench Division on Monday before the Lord Chief Justice, Mr. Justice Coleridge and Mr. Justice Sankey, Sir Richard Muir applied *ex parte* (on behalf of Messrs. Boots Cash Chemists) for a rule *nisi* for a writ of prohibition directed to the local committee under the Profiteering Act, 1919, at Wood Green, and to Mr. Scattergood, of High Road, Wood Green (the complainant), and to the Board of Trade.

The ground of the application, he said, was that the making up or dispensing of a prescription by a chemist was not the sale of an article within the meaning of the Profiteering Act. On October 16 Mr. Scattergood took a prescription to Messrs. Boots Cash Chemists (Southern), Ltd., retailers, a company quite distinct from Boots' Pure Drugs, Ltd. Boots Cash Chemists (Southern), Ltd., offered to dispense the prescription for 3s. 4d. Another chemist, Mr. Coulter, of the High Road, Wood Green, offered to dispense it for 5s. 6d. A similar application was made on behalf of Mr. Coulter. Neither Boots Cash Chemists nor Mr. Coulter did dispense the prescription because Mr. Scattergood took it elsewhere. The applicants received a summons in the form of a letter from the clerk of the local tribunal on October 23. The hearing before the tribunal was fixed for October 27. Boots Cash Chemists (Southern), Ltd., attended by their solicitor, who took the objection that the committee had no jurisdiction in the matter on the ground stated above. The objection was overruled and the hearing was proceeded with, but it was adjourned for a fortnight. Section 3 of the Profiteering Act, counsel said, was the only section which related to services as distinct from goods, and it only referred to trusts. It was really directed against monopolies. Many orders had been issued under the Act declaring what articles were to be included. The only order which had any reference to drugs or medicines was one which was published in the *London Gazette* of October 17, the day after the alleged offences in this case. The order was dated two days before the alleged offences. It declared certain articles to be within the Profiteering Act. The order included all drugs (excluding quinine sulphate, which was not controlled) and medicinal preparations. He submitted that a prescription which was to be made up was not a drug within the schedule, and that the making up of the prescription was not the sale of a medicinal preparation in the sense that it was an article for sale. The prescription was handed to a skilled person to select the proper drugs with which to make it up.

Mr. Justice Coleridge: Suppose that there was only one drug?

Sir R. Muir: It would still require skill to select it.

Counsel further argued that the purchaser paid not for the article, but for the skilled professional advice of the chemist. It was no more the sale of an article than a counsel's opinion was the sale of the paper on which it was written, or a deed prepared by a solicitor was the sale of the parchment. The chemist was paid for the skill and knowledge bestowed in making up the prescription. The Profiteering Act was passed on August 16, and it was to be in force for six months.

The Lord Chief Justice: We think that you ought to have the rule because you have shown enough ground for saying that the point ought to be argued, but the rule should be made returnable forthwith. It is necessary that the matter should be dealt with promptly. The rule will be made returnable for Saturday morning, and will be made peremptory. The rule will be directed to the local committee, and notice must be given to Mr. Scattergood and to the Board of Trade.

Non-delivery of Soda Ash

In the Bow County Court, on Friday, October 31, before Judge Graham, K.C., Messrs. V. L. North & Co., of 76, Finsbury Pavement, E.C., dealers in chemicals, claimed £63 18s. 6d. from Messrs. Senior, Crozier & Co., Union Works, Union Street, Stratford, chemical manufacturers.

Mr. Medcalf, for the plaintiffs, said that the action had been remitted from the High Court. He understood that overtures had been made by the other side for settlement, and a figure having been arrived at they were agreeable for judgment to be entered for that amount.

Of the sum claimed, £33 18s. 6d. represented the balance due for goods sold and delivered; and £30 was a sum agreed upon as damages for the defendants failing to deliver forty tons of soda ash at the docks by an agreed date, causing the plaintiffs to have to go into the open market and purchase at a higher figure. The order was placed on March 12 for delivery on March 2, but it was not carried out. A sum of £18 18s. 6d. had been paid into Court and the agreed balance was £45. Transactions had been going on for years between the parties, and this was simply an unfortunate incident.

Judge Graham, after hearing particulars of the claim, entered judgment for the plaintiffs for £45 and costs.

Government's Oil Production Policy

Director's Action for Libel

A SETTLEMENT was announced in the Lord Chief Justice's Court, last week, of a libel action brought by Sir John Cadman, Director of the Government's Oil Production Department and Petroleum Executive, against Mr. A. Lloyd Eastlake and Mrs. Eastlake, his wife.

Mr. E. F. Spence, for the plaintiff, said that since about January, 1917, Sir John Cadman had been a member of several Government Departments which had been formed to obtain oil. During that period there existed in those departments two sharply opposed theories as to the best means of obtaining oil. The plaintiff was the chief exponent for one theory, and he was attacked in several newspapers. Mrs. Eastlake, who was a member of the staff of the Petroleum Executive, held strong views, and she wrote three letters to the plaintiff containing serious charges. Between March 29, 1918, and January 20, 1919, eight anonymous letters were addressed to the Secretary of the Admiralty, the editor of the *Oil News*, Sir Marcus Samuel, and Sir Charles Greenaway. In all of these serious and untruthful charges of misconduct and incompetence were made against the plaintiff. For reasons which it was not necessary to disclose, the plaintiff and his advisers came to the conclusion that the defendant was the author of these anonymous letters, and he brought the action for libel, in which the only defence was denial of authorship. The parties had come to terms.

The plaintiff accepted the defendant's assurance that she did not write the anonymous letters complained of, and the defendants in turn recognised that the plaintiff was not acting unreasonably in instituting proceedings. The terms included a full indemnity to the plaintiff for his costs, and the signing of an apology by the defendants.

Mr. H. O. O'Hagan, for the defendants, read an apology in the form of a letter to Sir John Cadman. In this Mrs. Eastlake admitted that she had addressed to the plaintiff letters casting untrue and unfair aspersions on his character and conduct as a gentleman, and on his mode of treatment of the late Sir Boverton Redwood and herself. She also admitted authorship of a letter which had been published in the *Daily Chronicle* entitled "Behind the Scenes," which imputed to Sir John Cadman incompetence and unfitness to carry out his responsible duties as chief of the Petroleum Syndicate. She, however, denied the authorship of the anonymous letters. She concluded with an expression of appreciation of Sir John Cadman's work on the Petroleum Executive, and of his integrity, fairness, and courtesy to subordinates.

His lordship consented to the action's standing out of the list on the terms agreed.

Contracts Open

MATERIALS:—(10) glass; (11) lime and cement; (20) rubber and asbestos goods; (24) paints; (25) oils; (26) grease; (27) soaps. For the Cleansing Department, Glasgow. Particulars from Mr. W. Greig, 20, Trongate, Glasgow. Tenders by November 12.

RAILWAY STORES:—(2) oils, white lead, soap, paints, creosote, tar, etc.; (3) glass; (12) cement, etc.; (16) disinfectant, black lead, etc. For the Cheshire Lines Committee. Particulars from the Store Superintendent, Cheshire Lines, Warrington. Tenders by 10 a.m., November 26.

RAILWAY STORES:—(1) asbestos; (9) cement; (10) candles and soap; (13) creosote oil; (14) drysalteries; (16) glass; (17) grease; (26) oils. For the Midland Great Western Railway of Ireland. Particulars from the Storekeeper, General Stores Department, Broadstone Station, Dublin. Tenders by 10 a.m., November 18.

RAILWAY STORES.—(3) (*a*) paints, oils, etc. (*b*) varnishes; (4) (*a*) oils (lubricating), (*b*) oils (burning), (*c*) oils (lubricating and burning), (*d*) tallow, (*e*) chandlery; (10) (*a*) glass; (11) (*b*) cement; (15) carbide and calcium. For the Dublin and South Eastern Railway. Particulars from Mr. R. D. Griffith, Secretary. Tenders by 10 a.m., November 18.

RAILWAY STORES.—(7) cement, etc.; (8) colours, etc., ground in oil; (12) drysalteries; (15) glass plate sheet, lamp chimneys and gauge glasses; (23) lead (ground in oil and dry), sheet, etc.; (25) oils; (34) varnishes. For the Sligo, Leitrim and Northern Counties Railway Co. Particulars from the Secretary. Tenders by 10 a.m., December 1.

RAILWAY STORES.—(9) drysalteries; (14) glass (plate and sheet), etc.; (25) oils, tallow and turpentine; (27) soap and candles. For the Great North of Scotland Railway Co. Particulars from the Stores Superintendent, 80, Guild Street, Aberdeen. Tenders by 10 a.m., November 27.

Company News

ALBY UNITED CARBIDE FACTORIES.—The accounts for 1918 show, after writing off over £34,000 for depreciation, a net profit of £25,595, which with the sum brought forward makes £39,727. A dividend of 5½ per cent. has been paid on the Preference shares, and 6 per cent. on the Ordinary, leaving £6,837 to be carried forward.

ANGLO-PERSIAN OIL.—The company announces that as it has acquired a controlling interest in Scottish Oils, Ltd., it is now subject to Regulation 30BB of the Defence of the Realm Regulations. It is, however, making representation to the Board of Trade with the object of this being declared unnecessary. In the meantime the company is unable to accept transfers without the above regulation attached and signed.

BABCOCK AND WILCOX.—The directors announce that they have instructed their bankers to receive payment on applications for new Ordinary shares up to December 1, owing to many shareholders in America, India, and other places abroad not being able to forward their remittance by November 1, the date mentioned in the application form.

BRITISH BURMAH PETROLEUM CO.—This company announces an issue of 225,772 shares of 8s. each at a premium of 12s. per share. The transfer books will be closed until November 20, for compiling the lists of shareholders entitled to participate in the subscription for fully-paid shares of 8s. each, representing the unissued balance of the company's share capital, at a premium of 12s. per share, in the proportion of one new share for every four shares held, all fractions being ignored.

BRITISH OXYGEN CO.—Interim dividend of 5 per cent. (1s. per share), free of income-tax, on the Ordinary shares.

CHARLES KINLOCH & CO.—Interim dividend on the Ordinary shares at the rate of 10 per cent. per annum.

EVANS, SONS, LESCHER, AND WEBB (LIMITED).—It is announced with regard to the new issue of Ordinary shares, that it has not been possible to allot applicants the full number of shares applied for, as, although the issue was at 10s. per share premium, the shares were subscribed for over three and a half times, previous to the premature closing of the list. The shares have been distributed to the trade, and the public in proportion to the number applied for.

LANGDALE'S CHEMICAL MANURE.—The report for the year to September 30 last, states that the profit for the year is £6,918, and £3,643 was brought in, making £10,561. The directors propose to pay a dividend of 5 per cent., free of tax, for the year 1919, and a final dividend of 2 per cent., free of tax, for the year 1918, leaving to be carried forward £2,931, subject to excess profits duty and income-tax.

LEVER BROTHERS.—Subscriptions are invited for an issue of 4,000,000 seven per cent. Cumulative C Preference shares of £1 each at par. Associated Enterprises (Ltd.) (the whole of whose share capital is owned by this company), have recently agreed to purchase the whole or a majority of the shares of Price's Patent Candle Co. The shares acquired up to date represent over 90 per cent. of the total share capital of Price's Patent. Associated Enterprises (Ltd.) have recently purchased from Brunner, Mond, & Co., the whole of the issued Ordinary shares of Joseph Crosfield & Sons and William Gossage & Sons. The present issue is made in order to provide for the portion of the cash consideration shortly payable in respect of the purchase of the above-named shares, and also to provide further working capital required in connection with the development and extension of the business generally.

MAYPOLE DAIRY CO.—The directors propose to capitalise £308,333 of the reserve fund by issuing to shareholders of the Deferred Ordinary shares, fully paid Deferred Ordinary shares in the proportion of one for every three held.

NATIONAL MINING CORPORATION (LTD.).—Of the present issue of 2,500,000 shares, 2,000,000 have been applied for by the directors, and their associates, and will be allotted upon the terms of this prospectus, and 500,000 shares are offered for subscription at par. The authorised share capital of the company is 3,000,000 shares of £1 each.

NITROGEN PRODUCTS AND CARBIDE.—The profit for 1918 was £142,863, including £24,049 brought forward. A dividend of 9 per cent. has been paid, and £10,000 transferred to a reserve for contingencies, leaving £14,396 to be carried forward.

SCOTTISH-AMERICAN OIL.—Application is invited by the Scottish-American Oil and Transport Co., Ltd., for 1,000,000 shares of £1 each at par. The purchase price will be satisfied by the allotment of 2,000,000 shares, the whole of the present issue (less expenses) being available for the general purpose of the company. Sub-underwriters have asked for firm allotments of upwards of 400,000 shares. The share capital of the company is £5,000,000 divided into 5,000,000 shares of £1 each.

STANTON IRON WORKS.—The directors have declared an interim dividend of 6 per cent., free of tax, on the Ordinary shares. This is at the same rate as a year ago.

TREDEGAR IRON & COAL.—Interim dividend of 7½ per cent., free of tax, on the "A" and "B" shares for the half-year to September 30 last. Warrants will be posted on or before December 15.

VAN DEN BERGES, LTD.—The first dividend on the new issue seven per cent. "C" Preference shares will be paid on December 1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

LONDON GAZETTE.

Partnership Dissolved

ROSCOW, Tom Rigg, and SMITH, Owen James, under the title of Roscow & Smith, manufacturing chemists, Boome Street, South Shore, Blackpool, by mutual consent as from July 12. All accounts will be received and debts paid by Tom Rigg Roscow, who will carry on the business.

Bankruptcy Information

NEWTON, George Edward, 74, Great Tower Street, London, E.C., lately residing at 203, St. James' Road, Croydon, Surrey, wholesale chemist. October 29. First meeting, November 12, 11.30 a.m. Public Examination, December 19, 11 a.m., both at Bankruptcy Buildings, Carey Street, London, W.C.2.

Companies Winding Up Voluntarily

BRYNGWYN STEEL CO , LTD —Mr. J. S. C. Taylor, Russell Buildings, 13, St. Mary Street, Swansea, Chartered Accountant, appointed Liquidator. Meeting of creditors at Russell Buildings, 13, St. Mary Street, Swansea, on Monday, November 10, at 11 a.m. Creditors' claims on or before December 15 to J. S. C. Taylor, Russell Buildings, 13, St. Mary Street, Swansea.

CAMBRIA TIN-PLATE CO., LTD.—Mr. J. S. C. Taylor, Russell Buildings, 13, St. Mary Street, Swansea, Chartered Accountant, appointed Liquidator. Meeting of Creditors at Russell Buildings, 13, St. Mary Street, Swansea, on Monday, November 10, at 12 noon. Creditors' claims on or before December 15, to J. S. C. Taylor of Russell Buildings, 13, St. Mary Street, Swansea.

THE COVENTRY CONCRETE CO., LTD.—Mr. Henry Harrison, Avenue House Edgewick, Coventry, appointed Liquidator.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

HUGHES, A. R., 35, Mirch Park Street, Coventry.—Chemist. £10. September 20.

HUTCHEONS PHARMACY, 139, Golden Hillock Road, Birmingham.—£10 14s. 2d. September 24.

PARKER, R. E., 32, Hertford Street, Coventry.—Chemist. £11 5s. September 25.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, created after July 1st, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

AMERICAN VITROLITE CO. OF THE U.K. LTD., LONDON, S.W.—Registered October 23, £2,000 debentures, to C. M. B. Harvey, 15, Charles Street, Mayfair, W.; general charge. *£3,500. December 31, 1918.

BERRIDA (NIGERIA) TIN FIELDS LTD, LONDON, E.C.—Registered October 24, Trust Deed dated October 16, 1919, for securing £10,000 prior lien debentures; general charge. *Nil. December 31, 1918.

CALICO PRINTERS' ASSOCIATION LTD, MANCHESTER.—Registered October 21, two dispositions (in Scotch form) by way of additional security (supplemental to Trust Deed dated November 29, 1900, for securing £3,200,000 debentures stock); charged on (1) land at Campsie, Stirling, with buildings, &c., thereon known as the Lennox Mill Print Works; (2) land in Campsie near the town of Lennoxtown, being part of the mill lands of Lennox Mill, &c., with buildings, &c., thereon, and known as Stareleigh, Lennoxtown. *£3,700,000. October 2, 1918.

GREENWICH INLAND LINOLEUM (FREDERICK WALTON'S NEW PATENTS) CO., LTD., LONDON, E.C.—Registered October 27, £100,000 convertible notes to bearer; general charge, subject to existing issues of debenture stock of £120,000 and £100,000, respectively. *£215,000. April 29, 1919.

NEW BRITISH FUEL SYNDICATE, LTD., LONDON, S.W.—Registered October 22, £2,000 mortgage, to J. J. Bond, 2, Shrubbery Walk, Weston-super-Mare; charged on lands, hereditaments and premises in the parish of Sharpham & Meare (Som.). also registered October 22, £1,000 second mortgage, to J. P. Luff, The Towers, Evercreech, quarry proprietor; charged on the same property, but subject to the first-named mortgage for £2,000 *Nil. August 5, 1919.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.:—

ANGLO-AMERICAN SULPHUR COMPANY, LTD., 54, New Broad Street, E.C. To mine, and deal in sulphur, lead, zinc, copper, tin, &c. Nominal capital £150,000 divided into 75,000 Preference of £1 each and 75,000 Ordinary shares of £1 each. Qualification of directors, £1,000 shares. Remuneration of Directors, £200 per annum and £50 extra chairman. Subscribers: Charles Anderson Farquharson, 18, Wood Street, E.C.; Arthur Deman, East Sheen; Albert C. Freeman, Mill Lane, Hampstead; Wm. Robertson, 54, New Broad Street, E.C.

BRITISH SUGAR REFINERS' ASSOCIATION, 5, London Wall Buildings, Finsbury Circus, E.C. 2.—To promote and protect the commercial interests of British sugar refiners. Every member to contribute a sum not exceeding £1 1s. if necessary. Directors: E. Tate, 21, Mincing Lane, E.C. (President); Sir R. P. Lyle, 21, Mincing Lane, E.C. (Chairman); J. Fairrie, 21, Victoria Street, Liverpool (Vice-Chairman); R. Kerr, Grey Place, Greenock (Vice-Chairman); L. A. Martin, 21, Mincing Lane, E.C. (Treasurer).

CHARLES F. MORRISS & CO., LTD., 143, Lime Street, Kingston-upon-Hull, refiners and manufacturers of and dealers in oil, tallow and grease, &c. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: C. F. Morriss, 20 Gladstone Street, Hessle; F. B. Morriss, 20, Gladstone Street, Hessle; G. R. Miller, The Sheiling, Northfield, Hessle. Qualification of Directors, £100.

GENERAL MINING CO. (CORNWALL), LTD.—To purchase, take on lease or deal in, acquire and explore and work and turn to account any copper zinc, lead, tin, and other mines. Nominal Capital £25,000 in 10,000 Preference shares of £1 each and 15,000 Ordinary shares of £1 each. Directors: F. A. C. Jessett; H. C. Dixon, 170, Midd Vale Road, Ealing, W. Qualification of Directors, £250. Remuneration of Directors, £75.

HOLDER & SON, LTD., Wellington Chambers, 46, Cannon Street, E.C. 4.—Pharmaceutical, analytical, consulting chemists and druggists. Nominal Capital £3,000 in 3,000 shares of £1 each. Directors: H. N. Holder, Fairlight House, Regent's Park Road, Finchley, N. 3 (Managing Director). Qualification of Directors, £50.

INTERNATIONAL LABORATORIES, LTD.—Nominal capital, £10,000 in 10,000 shares of £1 each. Directors: R. A. Sweet, 10, Phoenix Place, W.C. (Governing Director). Qualification of Directors, 25 shares. Remuneration of Directors, £10 each.

LAWRENCE THOMPSON, LTD.—To acquire and carry on business of a chemist. Nominal Capital £1,500 in 1,500 shares of £1 each. Directors: L. Hurwitz, The Esplanade, Sunderland; J. Montgomery, 22, Hendon Road, Sunderland. Qualification of Directors, 1 share.

LLANGOLLEN TANNING CO., LTD., Maesmor Mills, Llangollen, Denbigh, tanners, curriers, and leather dressers. Nominal capital, £30,000 in 5,000 £7 per Cent. Cumulative Preference shares of £1 each, and 23,000 Ordinary shares of £1 each. Directors: H. B. Crawford, The Uplands, Penn, near Wolverhampton; C. E. Crawford, Pen-y-bryn Hall, Llangollen.

ORGANIC RESEARCH CO., LTD., 10A, Featherstone Buildings, Holborn, W.C.—To apply for or otherwise acquire any inventions, patents, secret processes or any interests therein relating to the production of acetone, butyl alcohol, &c. Nominal Capital, £21,000 in 20,000 shares of £1 each and 20,000 Founders' shares of 1s. each. Directors to be appointed by Subscribers. Qualification of Directors, 1 share.

REES WALTERS, LTD., chemists, druggists, and manufacturers of pharmaceutical medicinal and chemical preparations. Nominal capital, £3,000 in 3,000 shares of £1 each. Subscribers: H. D. Llewellyn, Derwydd, Brynealran Terrace, Llanelly; D. R. Walters, 12, Ladysmith Road, Penylan, Cardiff.

SAVOLOT (1919), LTD., 59, Ingrave Street, Battersea, S.W., soap manufacturers. Nominal capital, £2,500 in 2,500 shares of £1 each. Directors: G. F. Cripps, 4, Princes Street, Cavendish Square, W. 1. Qualification of Directors, £25.

SCOTTISH-AMERICAN OIL AND TRANSPORT COMPANY, LTD.—To acquire shares of the Southern Oil and Transport Corporation American) Company, and to carry on business of searching for

and mining, oils, shale, minerals, wax, natural gas, &c. Nominal capital, £5,000,000 in 5,000,000 shares of £1 each Minimum subscription, 7 shares. Directors: Howard Chaplin Back, Egypt House, New Broad Street; Thomas J. Callaghan, Cambrian Buildings, Cardiff; Sir Gilbert H. Claughton, Bart., Dudley, Worcester; Colonel John McAucland Denny, C.B., Dumbarton; Charles F. Garahl, 130, Broadway, New York; John S. Hamilton, 34, Lime Street, London. Qualification of Directors, £1,000. Remuneration of Directors, £1,000.

SILBURN COAL COMPANY, LTD., patent fuel manufacturers. Nominal capital, £10,000 in 10,000 Ordinary shares of £1 each Directors: To be appointed by subscribers. Qualification of Directors, £100. Remuneration of Directors to be voted by Company in general meeting. Subscribers: T. Rogers, Waverley Hotel, Whitley; W. Titterington, 15, Percy Avenue, Monkseaton.

TANNERS HIDE BUYING ASSOCIATION, LTD., Imperial Chambers, 62, Dale Street, Liverpool.—Importers of and dealers in hides, skins, fats, tallow and grease. Nominal capital £250,000 in 50,000 shares of 5s. each. Directors: T. T. Davies, Down House, Stoke Bishop, Bristol; A. L. Dixon, Morsely, Blundellsands; H. F. Glough, Woodleigh, 33, Grappinhall Road, Stockton Heath, Warrington; and seven others.

TECHNOGOR MINING AND ENGINEERING TRADING CO. (ENGLAND), LTD., 98, Great Tower Street, E.C. 3.—To acquire any mines, mining rights, oil wells, auriferous, oil-producing and metalliferous land and turn same to account. Nominal capital £25,000 in 25,000 shares of £1 each. Directors: G. A. Lvoff, 25, Redcliffe Square, W.; G. P. Zalkovitz, 121, Canfield Gardens, N.W. 6 (Chairman and Managing Director); M. Thieibout, 103, Cromwell Road, S.W. 7. Qualification of Directors, 100 shares.

THERMAL INDUSTRIAL AND CHEMICAL RESEARCH CO., LTD.—Research in relation to Distillation or treatment of solid liquid or gaseous matter. Nominal capital, £7,500 in 7,500 shares of £1 each. Directors: Sir A. McDougall Duckham, K.C.B., M.I.C.E., D. Rider, Sir W. J. Jones, K.B.E., J. S. Morgan. Remuneration of Directors to be voted by Company in general meeting. Subscribers: A. J. Hall, Shaldon, Upper Park Road, Bromley, Kent; E. N. Brown, 11, Stafford Mansions, Buckingham Gate, S.W. 1.

TURNERS GLASSWORKS CO., LTD. — General glass manufacturers. Nominal Capital £50,000 in 30,000 Preference shares of £1 each and 20,000 Ordinary shares of £1 each. Minimum Subscription, £10,000. Directors: A. E. M. Turner, South Austin, near Sheffield; G. H. M. Turner, 25, Blyth Road, Worksop; R. A. Smith, Albion Mills, Worksop. Qualification of Directors, 1 share.

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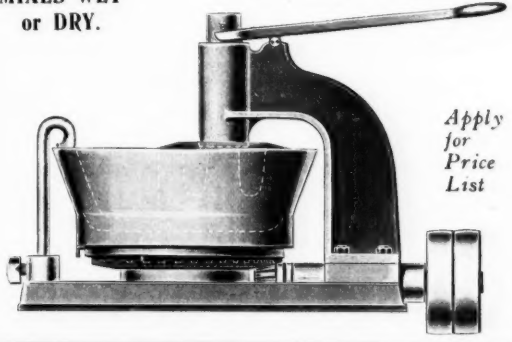
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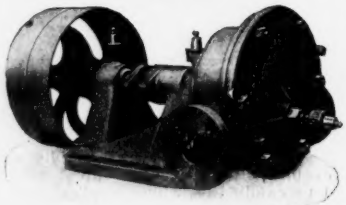

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